



THE ASSAM GAZETTE

অসাধাৰণ

EXTRAORDINARY

প্ৰাপ্ত কৰ্তৃত্বৰ দ্বাৰা প্ৰকাশিত

PUBLISHED BY THE AUTHORITY

নং 199 দিশপুৰ, শুক্ৰবাৰ, 26 এপ্ৰিল, 2024, 6 ব'হাগ, 1946 (শক)

No. 199 Dispur, Friday, 26th April, 2024, 6th Vaisakha, 1946 (S. E.)

GOVERNMENT OF ASSAM

ORDERS BY THE GOVERNOR

DEPARTMENT OF HOUSING AND URBAN AFFAIRS

NOTIFICATION

The 2nd August, 2023

eCFNo.342159/2023/121.- In exercise of the powers conferred by the Sub- Section (2) and (3) of section 10 of the Assam Town & Country Planning Act,1959 (as amended) read with Rule 6 of the Assam Town and Country Planning (Publication of Master Plan and Zoning Regulation) Rules 1962, the Governor of Assam is pleased to publish the following notice regarding the publication of the Final Master Plan for Makum.

Notice for Publication of the Final Master Plan for Makum

1. It is notified that the Final Master Plan for Makum is prepared by the Directorate of Town and Country Planning, Government of Assam and adopted by the State Government under sub section (2) and (3) of Section 10 of the Assam Town & Country Planning Act, 1959 (as amended) read with Section 6 of the Assam Town & Country Planning (Amendment) Rule, 1962 for the area described in the schedule below, is hereby published.
2. The Final Master Plan with all relevant papers and maps may be inspected free of Cost during the office hours at the office of the Director, Town & Country Planning, Assam, Dispur, Guwahati-6, the Deputy Director, Town & Country Planning, District Office- Dibrugarh, office of the Chairman, Makum Municipal Board, Doomdooma & Tinsukia Revenue Circle Office. Copies of the Final Master Plan is also available in the office of the Director, Town & Country Planning, Dispur, Guwahati-6 and Deputy Director, Town & Country Planning, District Office- Dibrugarh for sale on payment.

SCHEDULE

District	:	Tinsukia
Revenue Circle	:	Doomdooma & Tinsukia
Block	:	Itakhuli & Hapjan
Mauza	:	Hapjan, Tingrai & Tinsukia
Master Plan	:	Makum
Master Plan Area	:	45.07 Sq.km
Urban Area	:	3.66 Sq.km
Rural Area	:	41.41 Sq.km

Revenue Areas included in the Makum Master Plan

Sl No.	Name of Town & Village	Mouza	Block	Revenue Circle
1	Makum Town	Tinsukia/ Hapjan/ Tingrai		Tinsukia/Doomdooma
2	Makum Junction Gaon	Hapjan	Hapjan	Doomdomma
3	Chotohapjan T.E. 129 FS	Hapjan	Hapjan	Doomdomma
4	Betjan Gaon	Hapjan	Hapjan	Doomdomma
5	Betjan Bongali Gaon	Hapjan	Hapjan	Doomdomma
6	Betjan T.E. 154/151/NLR	Hapjan	Hapjan	Doomdomma
7	Longswal T.E. 254 NLR	Hapjan	Hapjan	Doomdomma
8	Longswal T.E. 210/208	Hapjan	Hapjan	Doomdomma
9	Amguri Gaon	Hapjan	Hapjan	Doomdomma
10	Longswal T.E. 109/112	Hapjan	Hapjan	Doomdomma
11	Chotohapjan T.E. 56/WL	Hapjan	Hapjan	Doomdomma
12	Chotohapjan Gaon No. 1	Hapjan	Hapjan	Doomdomma
13	Chotohapjan T.E.128 FS	Tingrai	Hapjan	Tinsukia
14	Chotohapjan T.E.114/4 FS	Tingrai	Hapjan	Tinsukia
15	Chotohapjan 120 Patta land	Tingrai	Hapjan	Tinsukia
16	Asomiya Balijangaon	Tingrai	Hapjan	Tinsukia
17	Chotohapjan Gaon No. 2	Tingrai	Hapjan	Tinsukia
18	Chotohapjan Gaon No. 3	Tingrai	Hapjan	Tinsukia
19	Hebeda T.E. 32 WL	Tinsukia	Itakhuli	Tinsukia
20	Hebeda T.E. 176/179 NLR	Tinsukia	Itakhuli	Tinsukia
21	Tengapani T.E. 664/105 NLR	Tinsukia	Itakhuli	Tinsukia
22	Makum Junction Bangali Gaon	Tinsukia	Itakhuli	Tinsukia
23	Tingrai Gaon	Tinsukia	Itakhuli	Tinsukia
24	Tingrai Bongali Gaon	Tinsukia	Itakhuli	Tinsukia

DESCRIPTION OF BOUNDRIES

North	:	Betjan T.E. 297 NLR, Denka Gaon, Chandmari Bongali Gaon
South	:	Tengapani T.E. No. 316 NLR Gt, No.2 Tingrai Hebeda, Tingrai Hebeda
East	:	Sukanguri T.E. 109/111 FS, Borhapjan Gaon, Panikhowa Bongali Gaon
West	:	Hukanpukhuri T.E. 37/73 Nlr Gr, Luhari Bongaligaon No. 2 Khetojan

KAVITHA PADMANABHAN,

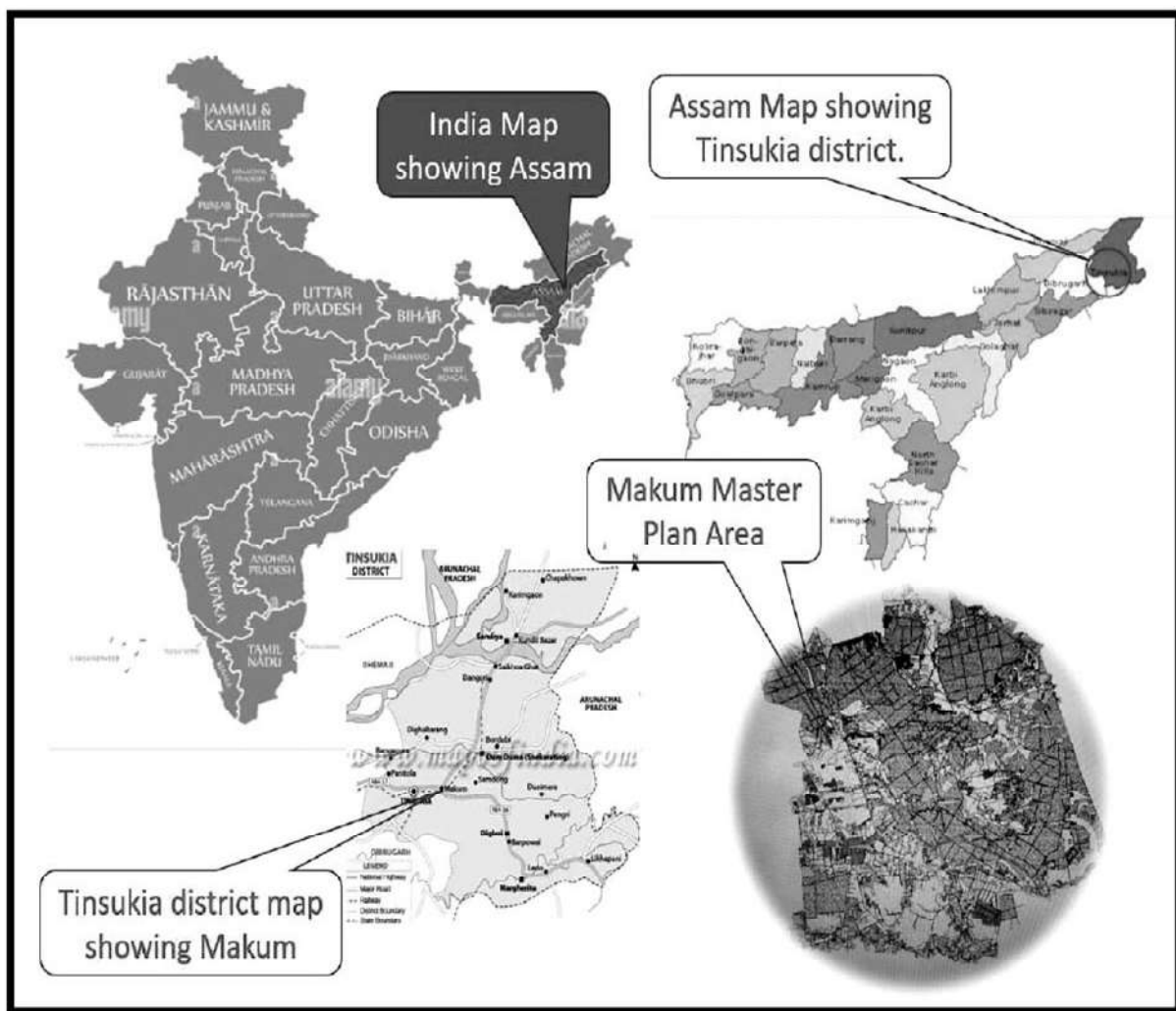
Commissioner & Secretary to the Government of Assam,
Department of Housing and Urban Affairs,
Dispur, Guwahati-6.

CHAPTER - 1

1. INTRODUCTION TO MASTER PLAN AREA

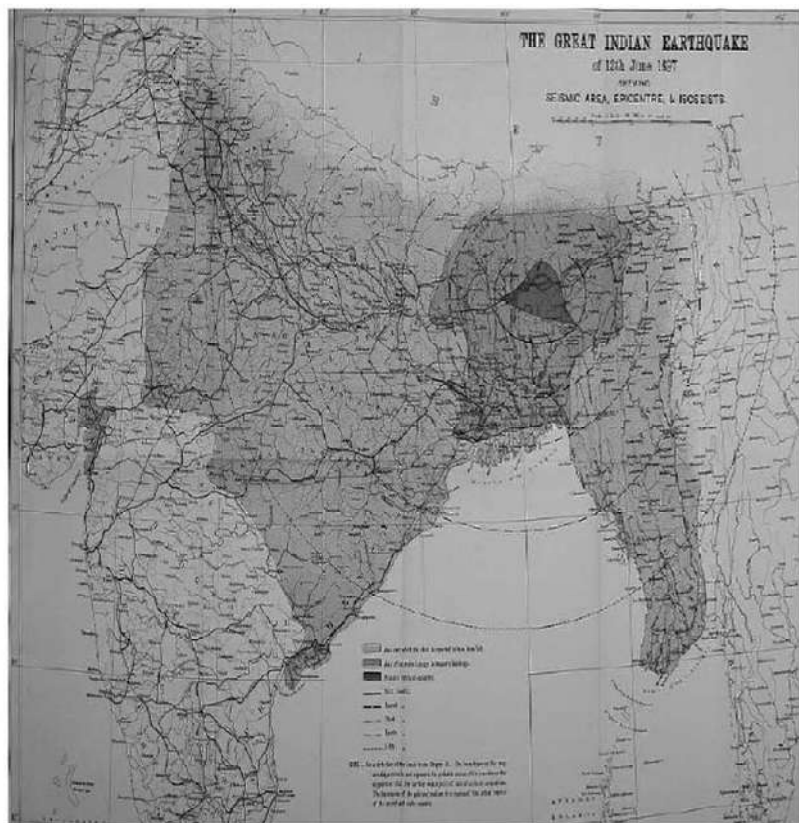
1.1 Location

Makum is tea-based industrial town of Assam. It is situated 496.1 km. towards north-east from state capital Dispur by road and 58.6 km. from nearest important town Dibrugarh and 8.9 Km from district head quarter Tinsukia. The town and its surrounding villages itself have a natural scenic beauty with the tea gardens and the place of habitants of the various ethnic tribes and linguistic people with their own cultural heritage. The geographical location of Makum town is $27^{\circ} 30' 0''$ North latitude and $95^{\circ} 27' 0''$ East longitude and has an average elevation of 125.66 meters (MSL). It is the meeting point of three premier towns of upper Assam namely Tinsukia, Digboi and Doomdooma. The National highway 15& 315 along with Makum Bypass passes through Makum.



1.2 Regional Setting

Makum master plan region falls in the north-eastern part of India in the upper Assam valleys. The whole master plan area is a flat level plain in the Hapjan, Tinsukia and Tingrai Mouzas. The general physical feature of the master plan area is both varied and picturesque in nature. The soil is composed of loose sandy texture with occasional sands and gravels. The phosphoric content is found in the soil which is good for tea cultivation. Acidic alluvial soils are suitable for tea cultivation. Like the rest of Assam, Makum master plan region is also a seismic area and is liable to earthquake. The great earthquake of 1897 was felt all over the region. It damaged many houses and buildings of the people as well as of the Govt. Again, the earthquake of August 15, 1950 has also damaged houses buildings and roads. The after effect of the earthquake brought a vast change to the topography of the region. The surrounding areas of Makum are mainly covered by tea gardens.



1.3 Brief History of the town

- In the 19th century, a small Chinese community was brought to India by the British to work as labourers in Assam's tea gardens. Several more who were poor and in need of work joined them over the years. As time passed by, a small village in upper Assam came to have the highest concentration of the community.
- **According the sources Makum name was derived from a Taiphake tribe language, where “Ma” means “to come” and “kum” means “to meet” i.e. to come and meet together (Meeting point).**
- **Other source is that Makum name come from the Chinese word, “Makum” which means Meeting point.**
- **First railway line from Dibrugarh to Ledo passes through Makum.**



Old Historical map showing Makum

As Makum once had a thriving community of Chinese who had settled in the area in the 1830's. The Chinatown in Makum was closed in 1962 following the outbreak of the Sino-Indian War – as Assam is in close proximity to India-China border, there were heightened security concerns. The Chinatown (now known as Chinapatty) is now inhabited by local population but many of the Chinese house structures left behind by the original Chinese inhabitants still remain.



BEFORE 1962



AFTER 1962

Makum town was originally a part of Lakhimpur district. When Dibrugarh was formed as separate district then the Makum town was under the jurisdiction of Dibrugarh District. When Tinsukia formed a separate district in 1989, Makum town committee was part of Tinsukia district. The Makum town committee was constituted in the decade 1980's comprising 3.66 Sq.km. As per Govt. Notification in 2018, Makum town committee was converted to Makum municipal board. Presently the Makum municipal board is having 10 wards.



Makum Municipal Board

1.4 Climate

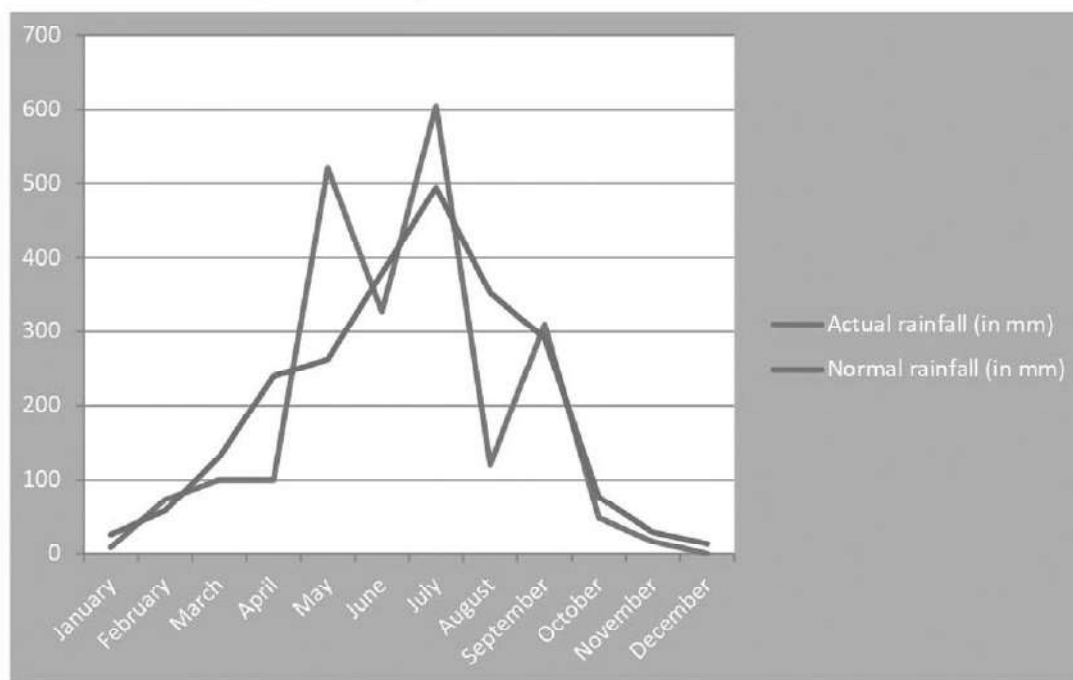
The climate of Makum is characterized by the absence of a dry hot summer season, the highest temperature being experienced during the monsoon season along with abundant rains and highly humid atmosphere throughout the year. Winter starts from December and end in February which is followed by a season of thunder storms from March to May. From June to the beginning of October is the season of south-west monsoon and October and November are marked as post monsoon season. The annual rainfall varies marginally from one to other. The cold season starts towards the end of November when both day and night temperatures begin to decline December and January are the coldest month of the year. With the mean daily maximum temperature at about 24° C and the mean daily minimum at 9° C to 11° C. Temperature begins to rise from the beginning of March. The rise in temperature continues up to September. The highest mean daily temperature experienced in July and August when the mean daily maximum temperature goes up to maximum of 34° C and the mean daily minimum temperature varies between 20° C to 25° C. With the termination of the monsoon season the weather become gradually pleasant and cool. The air remains highly humid throughout the year except during the period of February to march when the relative humidity is comparatively less particularly in the afternoon. Winds are light throughout the year except the short spells of strong winds during thunder storms in the period from March to May.

TABLE No-1
Average monthly rainfall data in Makum in 2019

Month	Actual rainfall (in mm)	Normal rainfall (in mm)
January	8.8	26.6
February	73.5	58.4
March	100.3	131.2
April	100.5	239.3
May	520.4	262.6
June	327.2	379.3
July	604.8	493.9
August	120.6	352.7
September	309.8	291
October	48.8	76.9
November	16.2	29.3
December	0.2	13.7
Average Annual rainfall	2231.1	2354.9

Source:- Statistical Hand Book Assam 2020

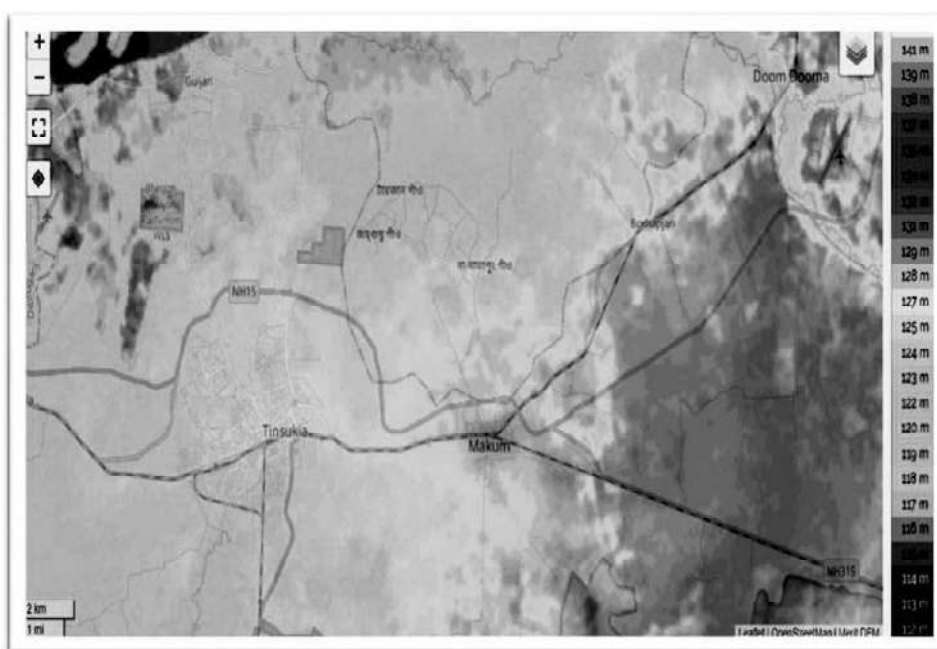
Figure No-1
Average monthly rainfall data of Makum in 2019



1.5 Topography

Topography is the study of the shape and features of the surface of the earth. The topography of an area could refer to the surface shapes and features themselves, or a description in maps. In modern usage topography involves generation of elevation data in digital form. It is often considered to include the graphic representation of the landform on a map by a technique, including contour lines, hypsometric tints and relief shading.

Below is the elevation map of Makum, which display range of elevation with different colours. The map also provides idea of topography and contour of Makum.



Topographical map of Makum

1.6 Soil Condition

Physio graphically the area is characterized by Doomdooma river plains in the north - west part with gentle slope towards south-west towards Tingrai river. The soil in the area may be grouped into two broad categories depending upon the origin and occurrence. These are given below-

- a. Newer alluvial soil – Flood plain areas of river Doomdooma & Tingrai and the tributaries in the northern part are characterized by light gray clay with sand and silt.
- b. Older alluvial soil - It occurs mainly in the central part with limonite yellow to reddish yellow clay.

Alluvial plain covers major part of the area. Ground water occurs in regionally extensive aquifers down to explored depth with a very good yield prospect. The aquifers are consisting of sand of various grades and are suitable for both shallow and deep tube wells. Makum region is covered by alluvial deposits of recent and sub-recent origin. In many places of the area, there are terrace deposits.

1.7 Settlement Pattern

Makum experienced the settlement of traders, construction workers, plantation workers, commercial establishment employees, tea-based and other industrial workers, service-oriented workers and Govt. employees since the early days. In Makum master plan area there are 11 tea gardens which support a huge number of labourers and their families and the members of supervisory and managerial staff. In the town area settlement pattern mainly exhibits by the Hindi, Bengali and Assamese speaking population. Plantation labour worker and indigenous people settlement is mainly found in the rural areas

1.8 Rural-Urban-Scenario

Makum master plan covers an area of 45.07 sq.km. Out of this urban area consists of 3.66 sq.km. and 41.41 sq.km. occupy by rural area. As per 2011 census urban area population is 16923 persons and rural area population is 22753 persons. So, in Makum master plan area (MMPA), urban population consists of 42.65 % and rural area population consists of 57.35%. Originally Makum developed as a plywood & tea-based town. Presently, due to the ban on tree cutting plywood factories were closed down and mainly tea-gardens are existing in the periphery of the town and the population working as tea workers and in tea factories and therefore the percentage of rural population is higher in comparison to urban population in the master plan area.

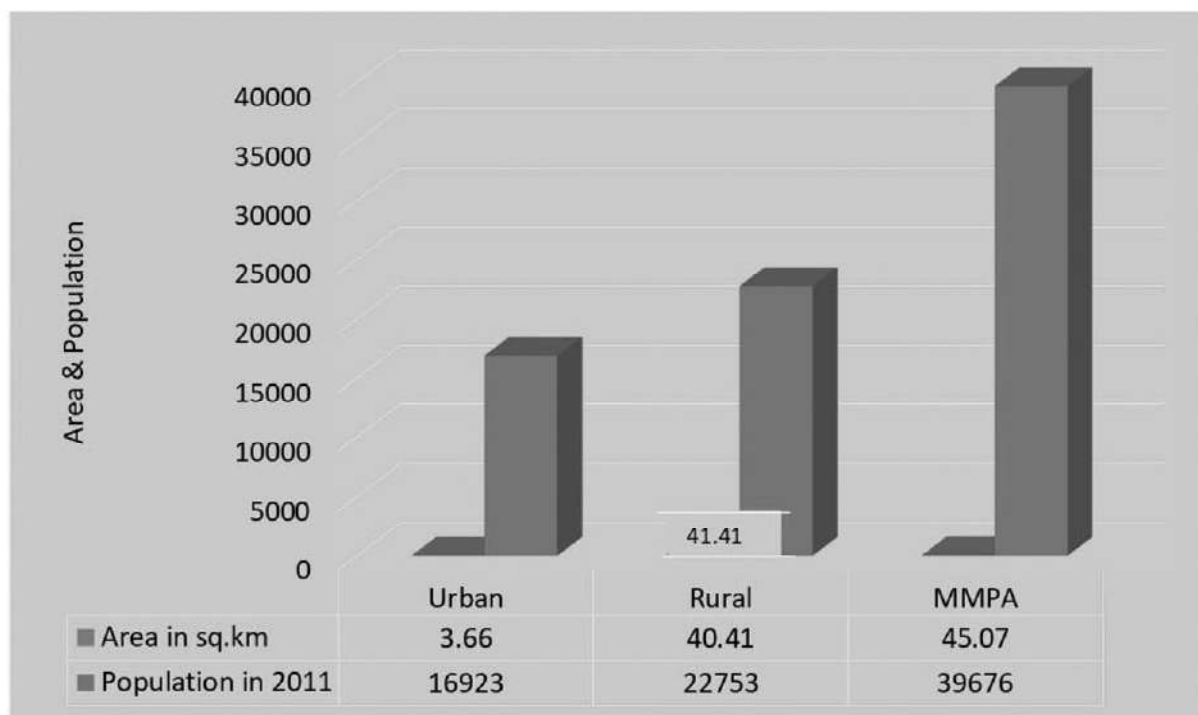
TABLE NO: - 2

Urban & Rural Area Population Figure in Master Plan Area

Name of the Master plan area	Category of area	Area in sq.km	Population in 2011
Makum master plan	Urban	3.66	16923
	Rural	41.41	22753
Total		45.07	39676

Source:- Census of India 2011

FIGURE NO-2
Urban & Rural Area Population Figure in Master Plan Area



1.9 Physical Growth and Expansion of the town

Physical growth and expansion of Makum town has been mainly taken place due to the commercial establishment, tea-based industries. Further, expansion of the town also takes place due to close proximity of Tinsukia & Doomdooma town.

For planning purpose Makum master plan area has been divided into the following zones: -

A. The Urban zone comprises the following areas:

1. 10 (ten) wards under Makum Municipal Board.

B. The rural zone comprises the following villages and tea gardens.

1. 12 Villages.
2. 11 Tea Gardens.

TABLE NO-3
Detailed area of Makum Master Plan

Sl. No.	Particulars (Area)	Area in Hectare
1	Makum town	366.00
2	Makum Junction Gaon	140.86
3	Chotohapjan T.E. 129 FS	459.47
4	Betjan Gaon	161.44
5	Betjan Bongali Gaon	113.92
6	Betjan T.E 154/151 NLR	163.36
7	Longswal T.E 254 NLR	97.37
8	Longswal T.E 210 / 208	148.26
9	Amguri Gaon	66.19
10	Longswal T.E 109 / 112	288.02
11	Chotohapjan T.E 56 WL	163.72
12	Chotohapjan Gaon No. 1	384.23
13	Chotohapjan T.E 128 FS	109.62
14	Chotahapjan T.E 114 / 4 FS	574.23
15	Chotohapjan 120 Patta land	84.41
16	Asomiya Balijangaon	147.5
17	Chotohapjan Gaon No. 2	124.38
18	Chotohaphan Gaon No. 3	89.4
19	Hebeda T.E 32 WL	26.36
20	Hebeda T.E 176/ 179 NLR	174.17
21	Tengapani T.E 664 / 105 NLR	29.15
22	Makum Junction Bongali Gaon	238
23	Tingrai Gaon	268
24	Tingrai Bongali Gaon	89.43
	Total	4507 Hectare (45.07 Sq.km)

Source : Area as per Census 2011

1.10 Need of the Master plan

The concept of planning has evolved gradually through the changing demand of man and environment but has assumed greater significance and wider connotation with the inception of the present century. The rapid pace of industrial expansion and urbanization has hastened the growth of urban centres. The forces operating behind urban expansion in recent years is becoming more and more difficult to direct or to control. To check the unplanned and haphazard growth of the towns, the principles of planning has been accepted as urgent an imperative.

A town is composed of land, building, people, utilities, services and transportation. It is a large configuration of more or less permanent settlers engaged in diverse economic activities. As the town grows, it attracts larger population; it enlarges the scope of their activities, while the complexity of living distorts the well-organized concept of the urban space organization.

Master plan is a statutory instrument for the provision of long-range vision for the built environment of a community. It guides the appropriate use of lands within a town and its adjacent areas in order to protect the public health and safety and to promote general welfare. Among other issues, the master plan can identify suitable locations for commercial, housing and mixed-use development; locations where the city/town should increase density, use redevelopment or intervene otherwise; opportunities to extend or improve open space, recreational areas and civic facilities; strategies for increasing economic development; environmental, historic strategies for solving congestion, improving transit services and also enhance the aesthetic beauty of the town. As a result, the master plan has a direct relationship to its citizens, whether we live, work or own a business.

The evils of unplanned growth of our towns have caused enormous problems such as shortage of living accommodation, traffic congestion, lack of sanitation and other community facilities and amenities. The growth of population and the potentiality of Makum to be an industrially and commercially vibrant town in the near future had led the state Government to realize the importance of proper planned growth of the town and the preparation of the master plan for this purpose.

In order to translate the suggested developments for Makum into action, it would be necessary to follow this master plan which is designed to regulate the future growth and to affect a uniform community. In preparing the master plan for Makum, various surveys such as land-use, socio-economic etc. were carried out to understand the existing scenario of the town and its adjoining rural areas and to suggest the line of actions to be adapted.

It is highly desirable at this point that the citizens of Makum should clearly understand the need for the master plan because a master plan is the city/town's long range plan and is important as it affects things we do every day and how we will do then in the future master plan guide city/towns decisions about important issues like what economic development strategy the city town should take; where certain types of business should the town try to attract; how much parking should be provided in neighbourhood; what improvements should be made to parks and recreations centres; How to protect our natural resources; why certain areas are designed as historic places. So, when we wonder why a building is allowed to be located somewhere, why certain streets are one-way streets, why a park has been built in our neighbourhood; a good place to start looking is the master plan. As such the most desired results could be positive civic interest and greater confidence which will create a conducive environment and our descendants will profit by our forethought or suffer from our negligence. What better work can we achieve than make their path easier, their homes more intimate, their public buildings more attractive and accommodating.

CHAPTER -2**2. DEMOGRAPHY****2.1 Total Population**

Demography is the study of human population such as size, growth, density, distribution and vital statistics. It helps to understand population dynamics by investigating three main demographic processes in Makum. It is essential that a good understanding of a population dynamics provide the basic for decision making, policy development and planning social and economic development processes and outcomes are depends upon the detailed study of population characterized of any planning area.

According to census of India 2011, the total population of Makum master plan area is 39676 persons, out of which 16923 persons live within Makum municipal board, 22753 persons live in rural areas of master plan. The following table shows the population distribution within Makum master plan area.

TABLE NO. 4
Population of Makum Master Plan area in 2011

Sl.No.	Area	Population (2011)	Percentage (%)
1	Makum municipal board	16923	42.65
2	23 villages & tea gardens	22753	57.35
	Master Plan Area	39676	100 %

(Source: Census of India 2011)

FIGURE NO. 3
Population Distribution of Makum Master Plan Area in 2011

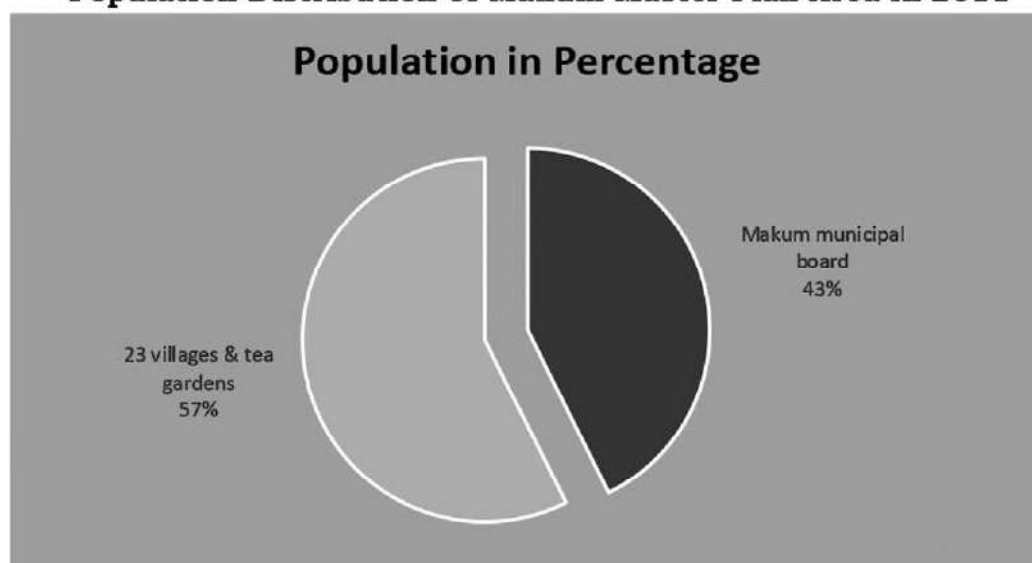


TABLE NO. 5
Detail population distribution of Makum Master Plan area in 2011.

Name	Population		
	Male	Female	Total
Ward No. 1	1103	1014	2117
Ward No. 2	1236	1205	2441
Ward No. 3	1128	1048	2176
Ward No. 4	860	845	1705
Ward No. 5	842	815	1657
Ward No. 6	598	548	1146
Ward No. 7	963	936	1899
Ward No. 8	641	631	1272
Ward No. 9	645	630	1275
Ward No. 10	626	609	1235
(A) Makum Municipal Board area	8642	8281	16923
Makum Junction Gaon	654	622	1276
Chotohapjan T.E. 129 FS	798	784	1582
Betjan Gaon	398	375	773
Betjan Bongali Gaon	247	234	481
Betjan T.E 154/151 NLR	715	723	1438
Longswal T.E 254 NLR	521	518	1039
Longswal T.E 210 / 208	325	350	675
Amguri Gaon	124	125	249
Longswal T.E 109 / 112	1058	987	2045
Chotohapjan T.E 56 WL	124	135	259
Chotohapjan Gaon No. 1	1424	1368	2792
Chotohapjan T.E 128 FS	97	95	192
Chotahapjan T.E 114 / 4 FS	1115	1121	2236
Chotohapjan 120 Patta land	105	101	206
Asomiya Balijangaon	380	398	778
Chotohapjan Gaon No. 2	1004	914	1918
Chotohaphan Ganon No. 3	137	151	288
Hebeda T.E 32 WL	262	243	505
HebedaT.E 176/ 179 NLR	245	226	471
Tengapani T.E 664 / 105 NLR	197	193	390
Makum Junction Bongali Gaon	552	531	1083
Tingrai Gaon	489	506	995
Tingrai Bongali Gaon	536	546	1082
(B) Rural area population	11507	11246	22753
(A) + (B) Total Master Plan area	20149	19527	39676

(Source: Census of India, Assam 2011)

FIGURE NO.4
Male & Female population distribution of
Makum Master Plan Area in 2011

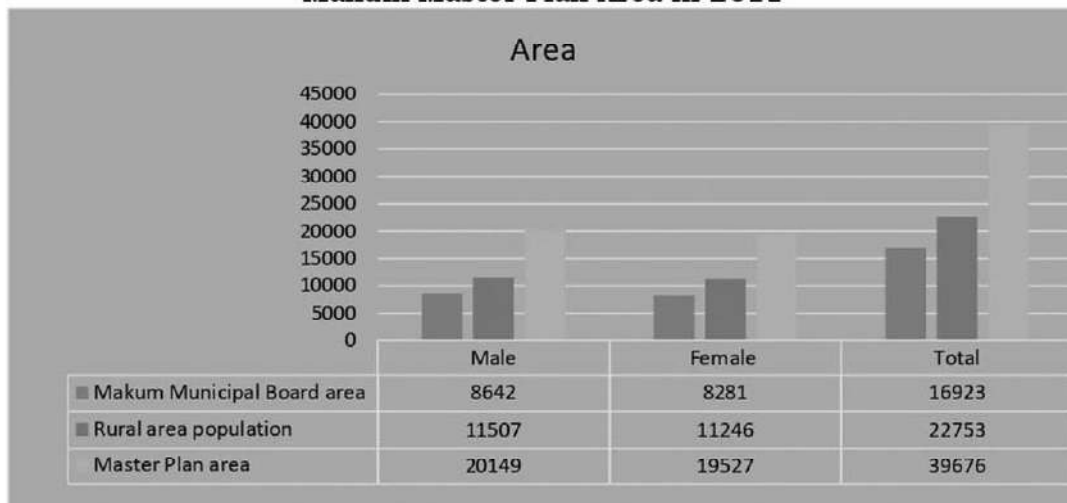
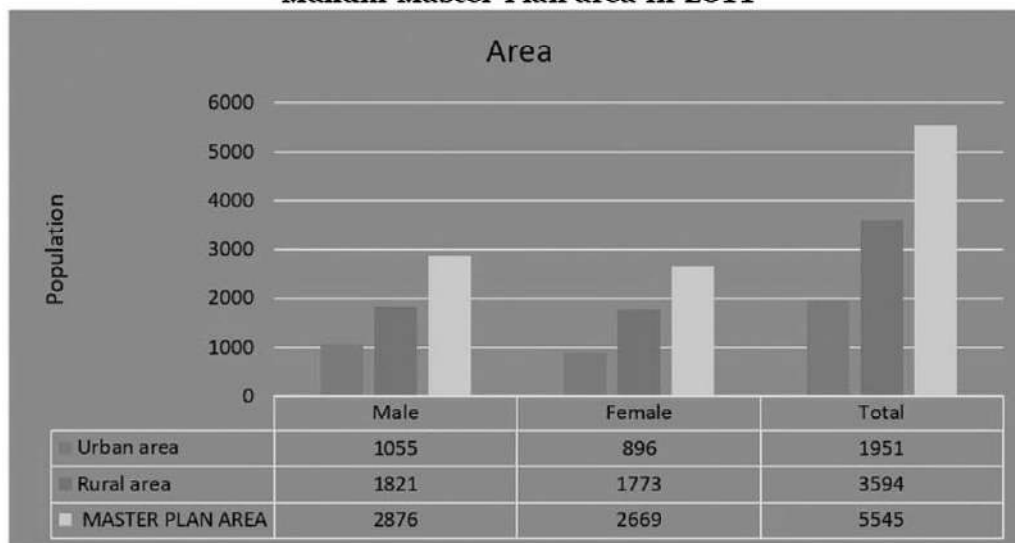


TABLE NO. 6
Population distribution of 0 - 6 years age group of
Makum Master Plan area in 2011.

Name	Population		
	Male	Female	Total
Urban area	1055	896	1951
Rural area	1821	1773	3594
Total Master Plan Area	2876	2669	5545

Source: - Census of India 2011

FIGURE NO. 5
Population distribution of 0 - 6 years age group of
Makum Master Plan area in 2011



2.1.1 Population Growth Rate

The purpose to provide facilities and services in community is to meet the physical, economic and social needs of the people. It is a study and understanding of the growth, distribution, composition and other characteristics of the population and trend are therefore the basic requirement for the wider range planning programmers. The objective of the master plan for Makum is to cater to the various needs emerging from these studies in order to meet the aspirations of its residents for whom the plan is prepared.

Table No. 7
Growth of population in Makum Municipal area

Year	Population	Decadal Growth Rate
1981	No census in Assam	No census in Assam
1991	11993	-
2001	15118	26.05%
2011	16923	11.94%

Source: - Census of India 2011

Figure No.-6
Decadal growth of population and growth rate in
Makum Municipal area 1991 to 2011

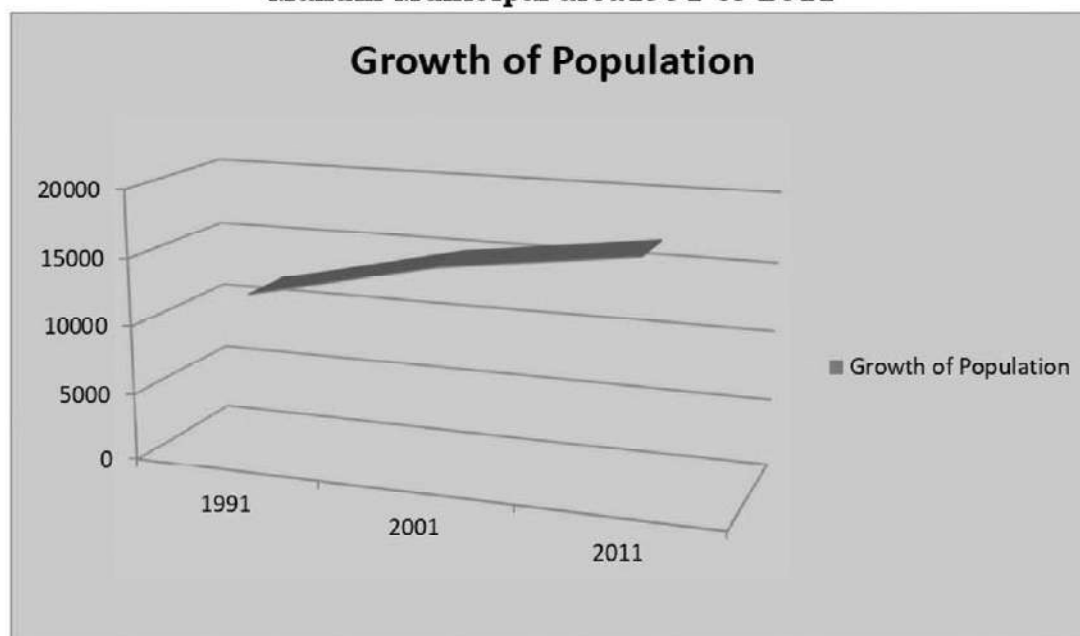


Figure No.-7
Percentage Decadal growth of population and growth rate in
Makum Municipal area 1991 to 2011

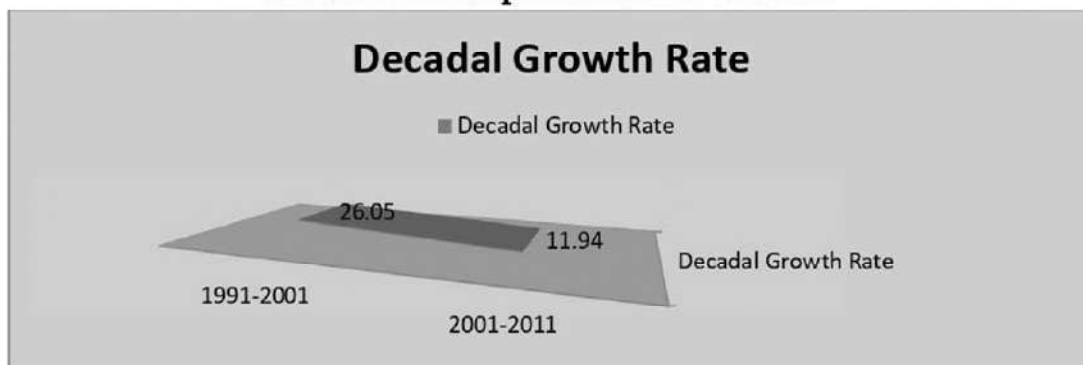
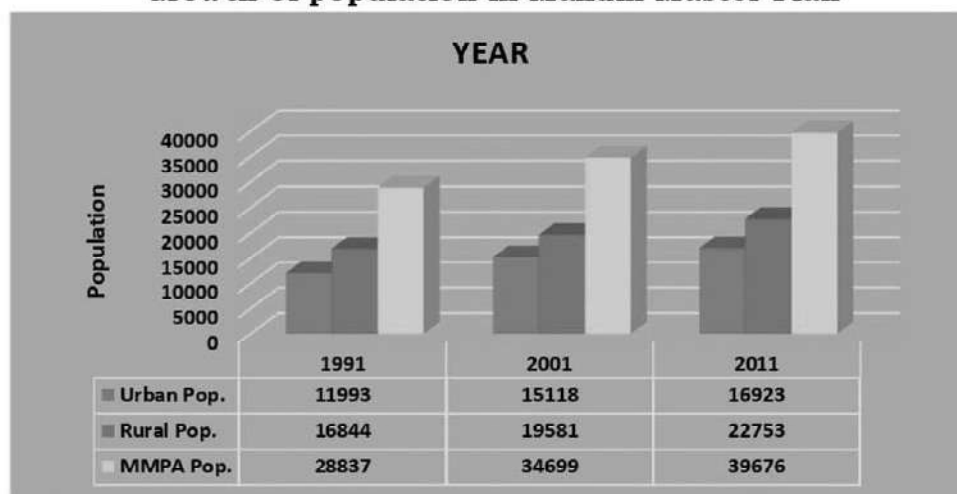


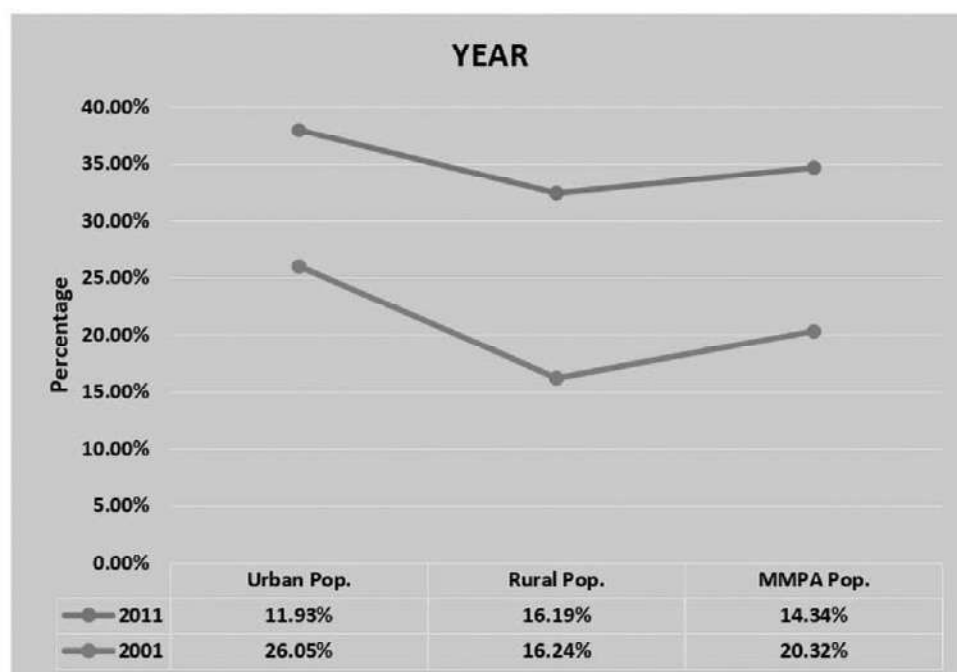
Table No. 8
Growth of population in Makum Master Plan

Year	Urban Area			Rural Area			Master plan Area		
	Popul ation	Decada l increas e of popu lation	Decadal Growth (%)	Popul ation	Decad al incre ase of popu lation	Deca dal Grow th (%)	Popul ation	Decada l increas e of popu lation	Decada l Growth (%)
1991	11993	-	-	16844	-	-	28837	-	-
2001	15118	3125	26.05	19581	2737	16.24	34699	5862	20.32
2011	16923	1805	11.93	22753	3172	16.19	39676	4977	14.34

Source: - Census of India 2011

FIGURE NO.-8
Growth of population in Makum Master Plan



**TABLE NO. 9****Population growth rate of Assam and Makum Master Plan Area:2001- 2011**

	Population		Growth Rate in %
Area	2001	2011	2001-2011
Assam State			
Total	26.66	31.17	16.93%
Urban	3.44	4.39	27.61%
Rural	23.22	26.78	15.35%
* Population in Millions			
Makum Master Plan			
Total	34.69	39.67	14.34%
Urban	15.11	16.92	11.93%
Rural	19.58	22.75	16.19%
* Population in Thousand			

Source: - Census of India 2011

2.1.2 Population Density

The net density of population in Makum municipal board area in 2011 is 4623 persons per sq.km. In rural area of master plan the density is 549

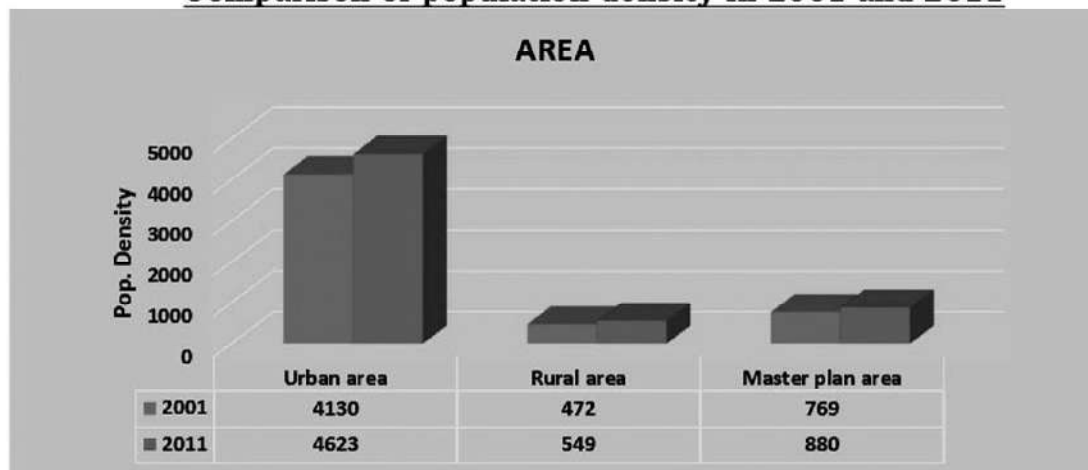
persons per sq.km. If we consider the master plan as a whole the density of population in 2011 is 880 person per sq.km. in Makum master plan area.

TABLE NO-10
Comparison of population density in 2001 and 2011

Year	Urban area	Rural area	Master plan area
2001	4130	472	769
2011	4623	549	880

Source:- Census of India 2001 & 2011

FIGURE NO-9
Comparison of population density in 2001 and 2011



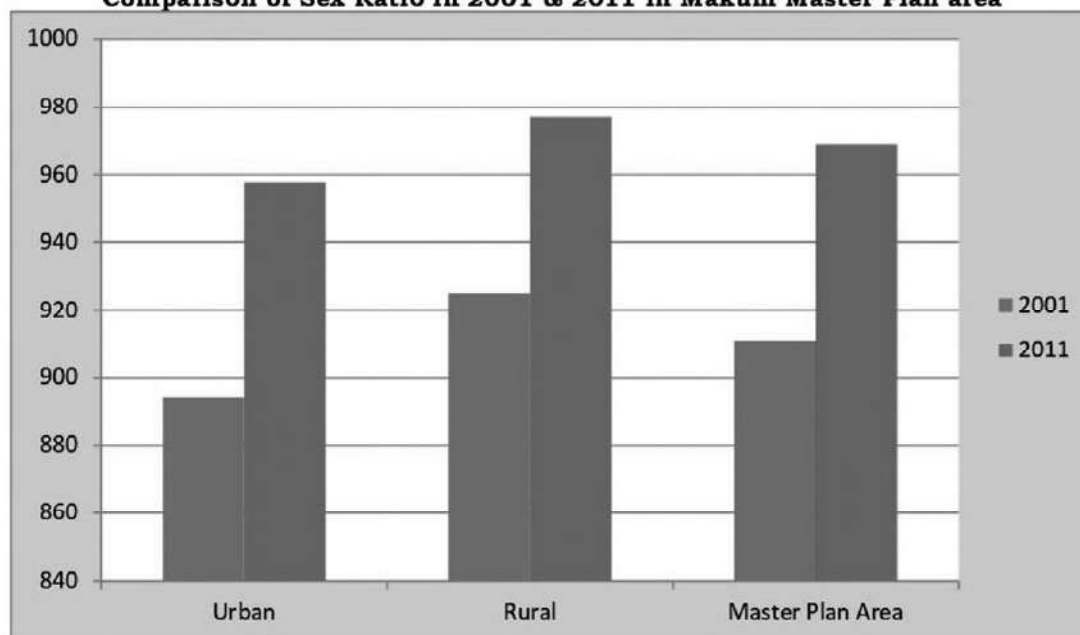
2.2 Sex Ratio

As per 2001 census the sex ratio in urban area of Makum master plan was 894 which is increase to 958 in 2011 census. In rural area sex ratio increased from 925 in 2001 to 977 in 2011. In Makum master plan area as a whole the sex ratio increases from 911 in 2001 to 969 in 2011. It has been noticed that the sex ratio in urban area as compared to rural area of master plan is higher both in the year 2001 and 2011.

TABLE NO. 11
Comparison of Sex Ratio in 2001 & 2011 in Makum Master Plan area

Year	Area	Male	Female	Sex-ratio
2001	Urban	7981	7137	894
	Rural	10173	9408	925
	Master Plan Area	18154	16545	911
2011	Urban	8642	8281	958
	Rural	11507	11246	977
	Master Plan Area	20149	19527	969

Source:- Census of India 2011

FIGURE NO-10**Comparison of Sex Ratio in 2001 & 2011 in Makum Master Plan area**

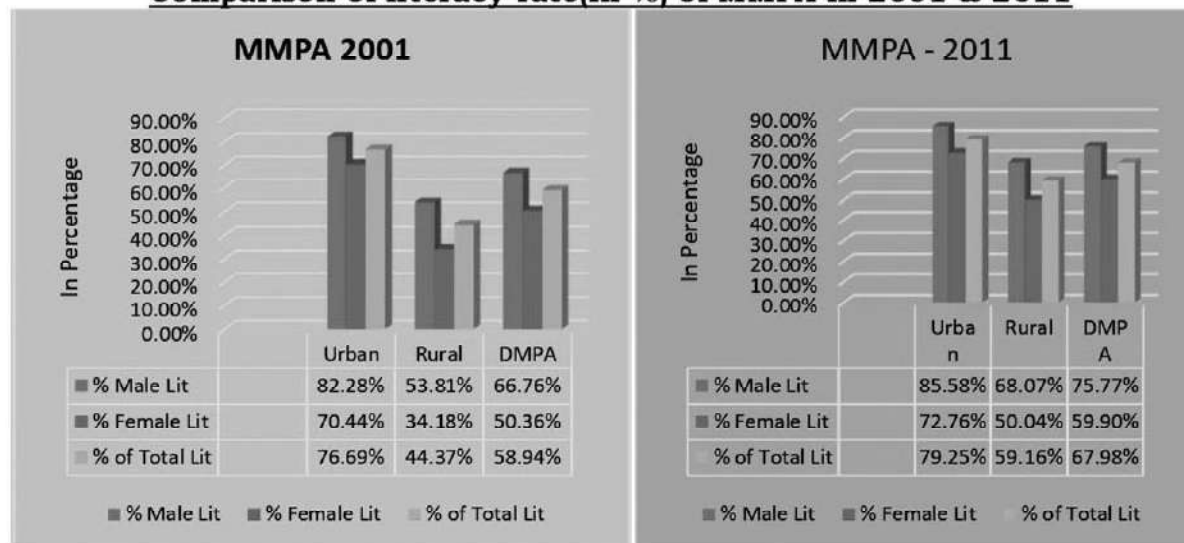
2.3 Literacy

The literacy rate of Makum urban area as per census of India report, 2011 is 79.25% which is below the state urban literacy rate of 88.88%. In the master plan area, the literacy rate in 2011 is 67.98%. The comparison of literacy rate in 2001 and 2011 for Makum master plan area is given below: -

TABLE NO: -12**Comparison of literacy rate of MMPA in 2001 & 2011**

LITERACY RATE OF MMPA - 2001												
Area	Total Male pop	Total Male pop Excluding 0-6 age	Actual Male Lit pop	% Male Lit	Total Female pop	Total Female pop Excluding 0-6 age	Actual Female Lit pop	% Female Lit	Total Pop	Total Pop Excluding 0-6 age	Total Actual Lit Pop	% of Total Lit
Urban	7981	6954	5722	82.28	7137	6216	4379	70.44%	15118	13170	10101	76.69
Rural	10173	8333	4484	53.81	9408	7713	2636	34.18%	19581	16046	7120	44.37
MMPA	18154	15287	10206	66.76	16545	13929	7015	50.36%	34699	29216	17221	58.94
LITERACY RATE OF MMPA - 2011												
Urban	8642	7587	6493	85.58	8281	7385	5373	72.76%	16923	14972	11866	79.25
Rural	11507	9686	6594	68.07	11246	9473	4741	50.04%	22753	19159	11335	59.16
MMPA	20149	17273	13087	75.77	19527	16858	10114	59.90%	39676	34131	23201	67.98

Source:- Census of India 2001 & 2011

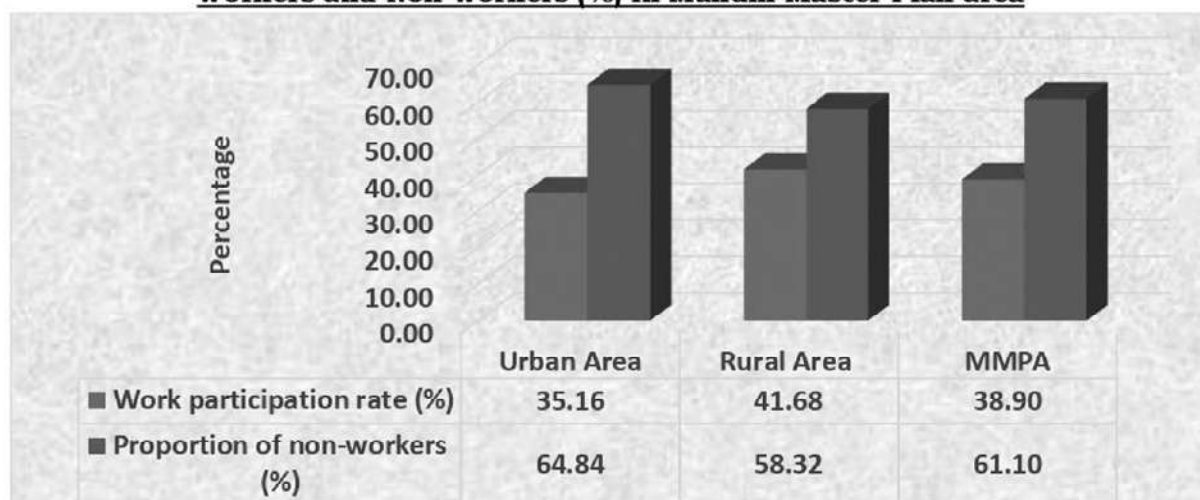
FIGURE: -11**Comparison of literacy rate(in %) of MMPA in 2001 & 2011****2.4 Working and Non-Working Population**

Out of total population of 39676 persons in Makum master plan area the working population is 15433 persons equivalent to 38.90 % which is equal to the national average. The balance non-working population is 24243 i.e., 61.10% mainly consist of women group and unemployed section of the population who are seeking employment in white collard jobs as well as investment opportunities in business and outside workforce age category.

TABLE NO: -13**Workers And Non-Workers in Makum Master Plan area**

Category	Urban Area			Rural Area			Total (Master Plan Area)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Main Workers	3947	777	4724	4674	2388	7062	8621	3165	11786
Marginal Workers	865	361	1226	1254	1167	2421	2119	1528	3647
Total Workers	4812	1138	5950	5928	3555	9483	10740	4693	15433
Non-workers	3958	7015	10973	5579	7691	13270	9537	14706	24243
Work participation rate (%)	54.87	13.96	35.16	51.52	31.61	41.68	52.97	24.19	38.90
Proportion of non-workers (%)	45.13	86.04	64.84	48.48	68.39	58.32	47.03	75.81	61.10

Source: - Census of India 2011

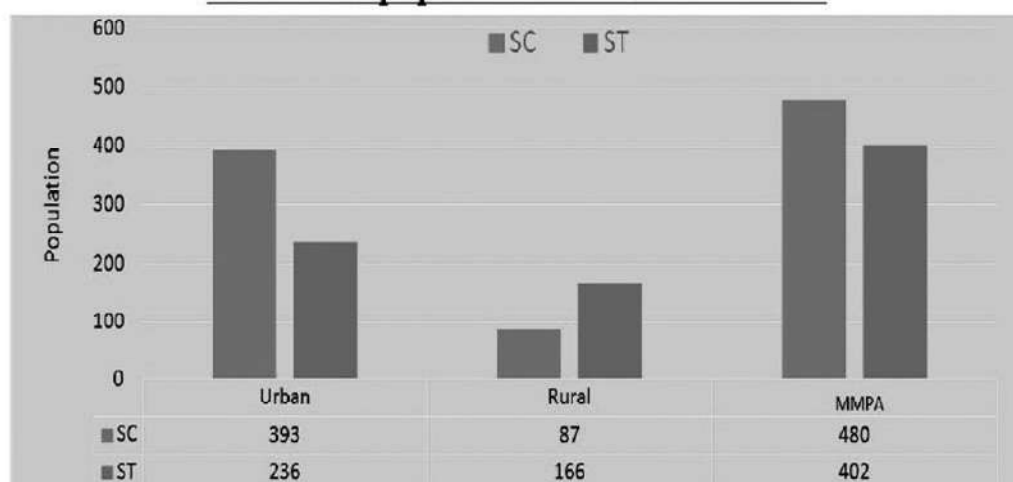
FIGURE NO:-12**Workers and Non-Workers (%) in Makum Master Plan area****2.5 SC-ST Population**

The details of SC and ST population for the Makum master plan area (MMPA) have been shown in the following table.

TABLE NO: - 14**SC and ST population of MMPA in 2011**

Caste	Urban	Rural	MMPA
SC	393	87	480
ST	236	166	402

Source: - Census of India 2011

FIGURE:-13**SC and ST population of MMPA in 2011**

2.6 Migration Population

The robust local economy once attracted scores of people from other parts of the country to settle here in search of jobs and business opportunities. In addition to Assamese and various indigenous ethnic groups, earlier the town is home to hundreds of Chinese people who migrated from China. After war between India & China in 1962 most Chinese people return back to their native place. In the last few decades, the people migrated from undivided Bengal, Bihar, Uttar-Pradesh, Rajasthan for business purposes in Makum. Apart from these a large section of tea-garden workers from Orissa and Jharkhand migrated to this region since long back to work as a labourer in the tea gardens.

2.7 Residential Density and Size

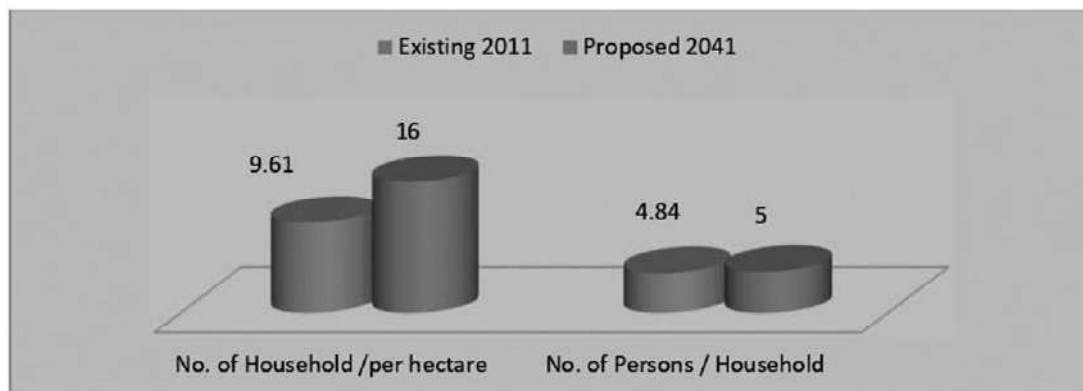
There are about 8197 residential houses in the year 2011 in Makum master plan area. The total population of planning area is 39676 persons, as such, household size is 4.84 persons. Since in Makum master plan the existing land used for residential purposes is 853 hectares, as such existing residential density is 9.61dwelling units per hectare. As per projection, gross housing requirement in the planning area is 16715 in 2041 and proposed land uses for residential purpose is 1060 hectares, as such the residential density in the year 2041 will be 16 dwelling units per hectare. The household size in 2041 will be 5 (five) persons per house.

TABLE No-15
Existing and proposed Residential Density
and Household size comparison in 2011 and 2041

	Existing 2011	Proposed 2041
Residential Density	9.61 household / hectare	16 household / hectare
Household Size	4.84 persons / household	5 persons / household

Source: -Calculated by T&CP, DBRG

FIGURE No-14
Existing and proposed Residential Density
and Household size comparison in 2011 and 2041



2.8 Population Projection

Population projection is a forecasting tool that helps to estimate the changes in population size and demographic structure. It is mandatory for the Govt. Policy makers and planners of Assam, in order to determine the future demand for basic human needs such as food, water, education, energy and services and to forecast future demographic characteristics.

The main objective is to provide or undertake activities aimed at achieving population stabilization, sustainable economic growth, social development and environmental protection by 2041.

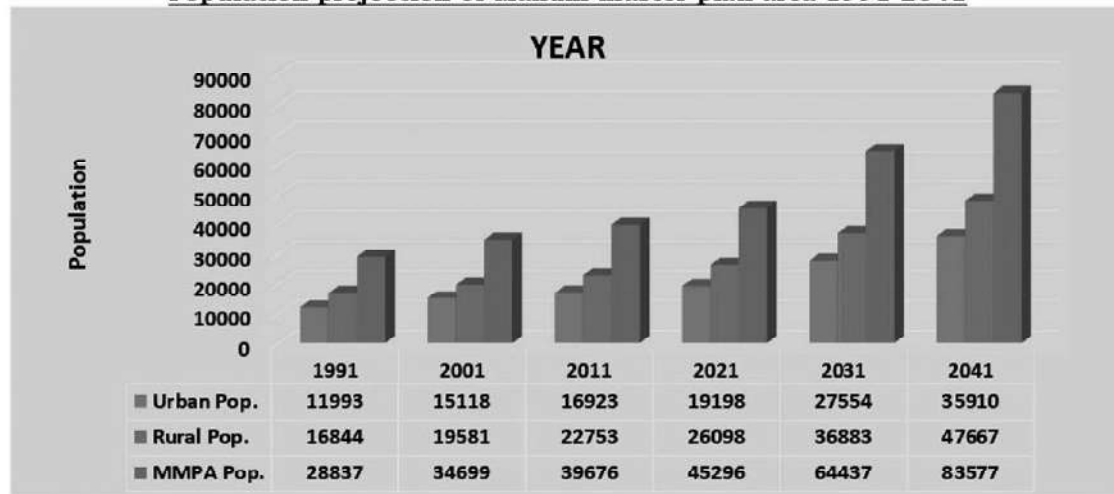
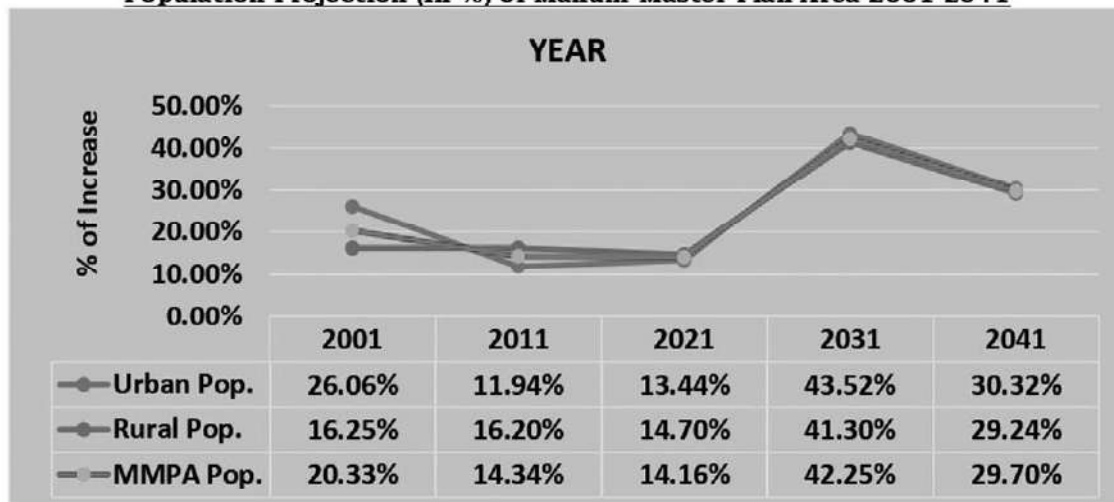
Population projection is a scientific attempt to keep into the future population scenario, conditioned by making certain assumptions, using data to the past available at that point of time. Assumptions used and their probability of adhering in future forms a critical input in this mathematical effort. Predicting the future course of human fertility and mortality is not easy, especially when looking beyond much further in time. Medical and health intervention strategies, food production and its equitable availability, climatic variability, socio-cultural setting, economic condition and a host of other factors influence population dynamics, making it a somewhat unpredictable exercise. Therefore, much caution must be exercised when either making or using the population projection and the context of various conditions imposed, should not be lost sight of on the basis of past behaviour and the likely future scenario assumed.

The final population projections of Makum master plan area have thus been arrived at with the entire base population of 1991 accounted for as the natural population, by adding to the natural population the increase due to the natural growth plus the increase due to emigrational flow of trade & commerce including natural increase of migrants. The following table shows the population projection up to 2041 for Makum master plan area.

TABLE NO - 16
Population projection of Makum master plan area 1991-2041

YEAR	Urban Population	% Of increase	Rural Population	% Of increase	Master Plan Area Population	% Of increase
1991	11993	-	16844	-	28837	-
2001	15118	26.06%	19581	16.25%	34699	20.33%
2011	16923	11.94.%	22753	16.20%	39676	14.34%
2021	19198	13.44%	26098	14.70%	45296	14.16%
2031	27554	43.52%	36883	41.30%	64437	42.25%
2041	35910	30.32%	47667	29.24%	83577	29.70%

Source: Makum master plan area population of 1991, 2001 and 2011 are from Census of India, Assam and 2021, 2031 and 2041 population figures estimated by Town & Country Planning, Dibrugarh.

Figure-15**Population projection of Makum master plan area 1991-2041****Figure-16****Population Projection (In %) of Makum Master Plan Area 2001-2041**

CHAPTER -3**3. ECONOMIC BASE AND EMPLOYMENT****3.1 Formal Sector**

Sector which encompasses all jobs with normal hours and regular wages and are recognized as income sources on which taxes must be paid are known as formal sector. In local terms, organized sector or formal sector in India refers to licensed organizations, i.e., those who are registered. Only 6 (six) per cent of India's working population is part of the formal sector and the productivity in formal sector is high in comparison to informal sector and also offers higher wages to its employees.

Makum Master Plan area having tea gardens such as Chotohapjan T.E. 129 FS, Betjan T.E 154/151 NLR, Longswal T.E 254 NLR, Longswal T.E 210 / 208, Longswal T.E 109 / 112, Chotohapjan T.E 56 WL, Chotohapjan T.E 128 FS, Chotohapjan T.E 114 / 4 FS, Hebeda T.E 32 WL, Hebeda R.E 176/ 179 NLR, Tengapani T.E 664 / 105 NLR, Gangabari T.E Estate produces export quality tea.

In Makum there is a vast scope for establishing tea related ancillary

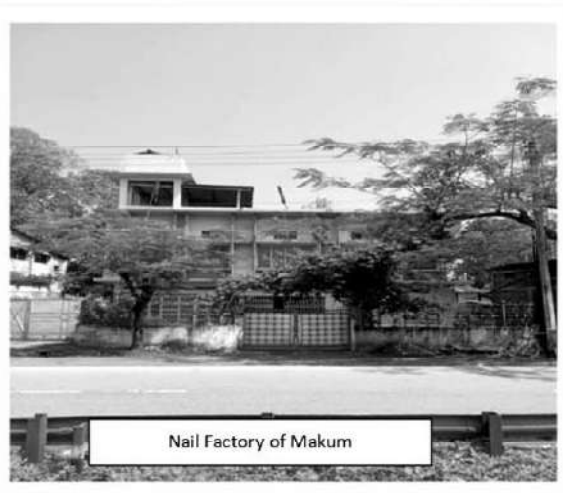
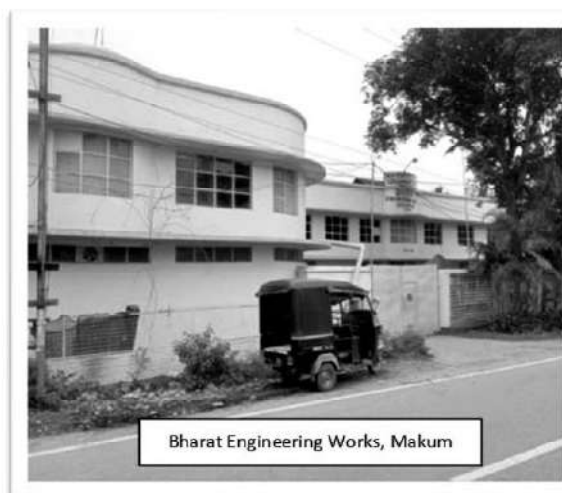


industries due to the existence of large number of tea gardens and factories. As such this plan asked the Govt. for creation of a conducive atmosphere for optimum use of natural resources as well as tea products in private sector and public-private partnership mode to build up a sound economic and industrial base in the master plan area.

Besides markets it has Nail making factory, Victory Industry making transformer and Bharat Engineering making machine used in tea factory.

These markets & industries have played an important role in the economic expansion of Makum town.

The industrial development targets as proposed above can be achieved through private sector & Governmental agencies by providing suitable industrial land with necessary infrastructure like roads, uninterrupted power, water and



drainage and subsidy on power tariff, financial assistances in the form of soft loan etc. The present concept of public-private partnership (PPP) can also be adapted for faster and smooth development of industries.

3.2 Informal Sector

The informal sector is that part of an economy which is neither taxed nor monitored by any form of government. Activities of the informal economy are not included in the GNP. The informal sector makes up a significant portion of the economies in poor state like Assam as well as Makum region. The informal sector of Makum region provides critical economic opportunities for the poor and has



been expanding rapidly since the 1990s. The informal sector is largely characterized by several qualities such as easy entry, meaning anyone who wishes to join the sector can find some sort of work which will result in cash

earnings, a small scale of operations and skills gained outside of a formal education. Most workers in the informal sector, even those are self-employed or wage workers, do not have access to secure work, benefits, welfare protection or representation. The most prevalent types of work in the informal economy are home based workers and street-vendors which are most common in MMPA. Home based workers are more numerous while street-vendors are most visible.

Makum town is known for meeting point and could be the nerve centre of business & service of that area. People of nearby areas use to come here to sell their produce and to buy necessary goods for their domestic consumption. There are a number of markets in Makum, such as Daily Market, Sunday Market & Ruby Market etc. These markets fulfill the demand for Makum and its suburbs.

3.3 Occupational Pattern

Occupational structure depicts the characteristics of employment for livelihood of the people living in a particular planning area. The engagement of people in agriculture, trade, commerce, industry and white-collar jobs etc. is known as the occupation and employment character. Out of total population of 39676 in 2011 for the master plan area, the number of workers is 15433 persons. The percentage of working population in urban area is 35.16% and in rural area 41.68% in 2011. The percentage of working population in rural area is higher in comparison to urban area. The percentage of working population in the master plan area as a whole is 38.90% in 2011. The sector wise distribution of workers in the master plan area in 2011 is given below. Since Makum is known as a tea & commercial based town, in the map of India due to large number of tea estates and tea factories and it is also reflected in the occupational pattern of master plan area where almost 85.46% of population get their livelihood from tertiary sector (including tea plantation workers).

TABLE NO.-17

Sector wise distribution of workers in the Makum master plan area in 2011

Sl. No.	Category	Urban Area		Rural Area		Makum Master Plan area	
		No. of workers	% Of total Urban workers	No. of workers	% Of total Rural workers	No. of workers	% Of total MMPA workers
1	Primary Sector (Agriculture)	222	3.73	1522	16.05	1744	11.30
2	Secondary Sector (Household Industry)	309	5.19	191	2.01	500	3.24
3	Tertiary Sector (Others)	5419	91.08	7770	81.94	13189	85.46
	TOTAL	5950	100.00	9483	100.00	15433	100

Source: -Calculated by T&CP, Dibrugarh on the basis of 2011 Census

FIGURE No. 17
Sector wise distribution of workers in the master plan area in 2011

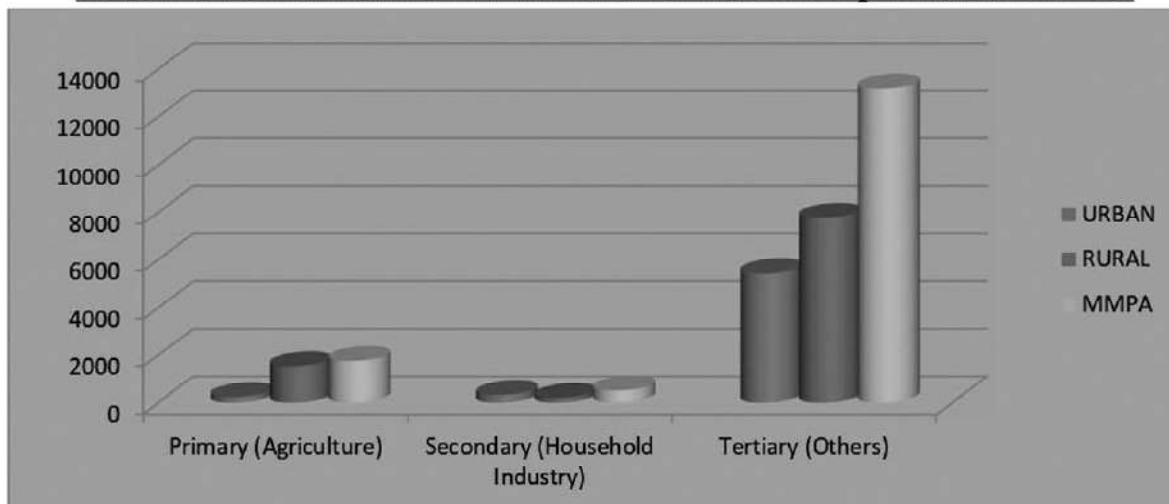
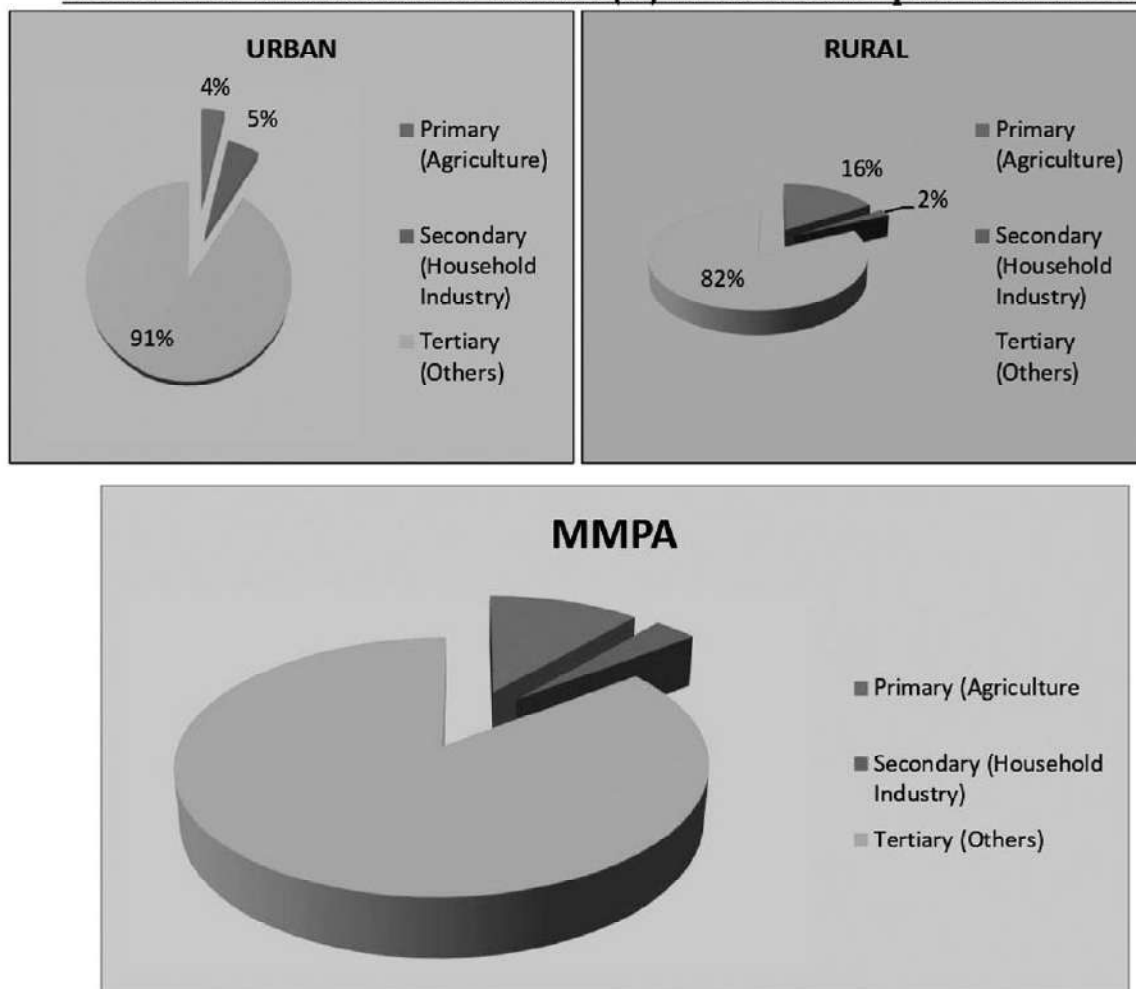


FIGURE No. 18
Sector wise distribution of workers(%) in the master plan area in 2011



Makum is place of scenic beauty of nature with various beautiful tea gardens. Expansion of micro, cottage and service industry in the town and as well as in the out skirts of the town also creates employment opportunities for many people. In view of the above, the question of livelihood can be separated on the following heads as mentioned below: -

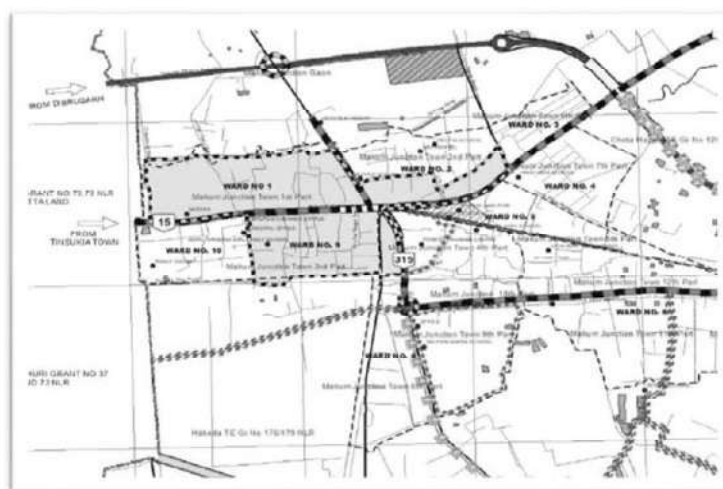
- (a) Engagement in agriculture and tea related activities.
- (b) Engagement in industrial activities including micro and household industries.
- (c) Engagement in trade and commerce.
- (d) Serving as Govt. employee & private employee.

3.4 Central Business District

A Central Business District (CBD) is the commercial and the business center of a town or city, often refer to as the “financial district”. CBDs traditionally develop in historic towns as the market square where there would be trade and other business activity this would typically be in the geographic center of the settlement. However, as town grows and became more populous, CBDs became a more fix location where retail and commerce took place. Some of the key characteristic of the CBDs include: -

1. High concentration of offices, banks, financial institutions and so on
2. High density and high-rise building
3. High land value
4. Lack of open and green space
5. Multistory car parking
6. Departmental stores
7. Well manage infrastructure links with other parts of the towns
8. High concentration of pedestrians

Accordingly, as per the characteristic of Makum town a CDB has been earmarked in Makum master plan as shown in proposed land use and zoning map covering an area of 0.71 sq.km.



CHAPTER- 4

4. HOUSING AND SHELTER

4.1 Housing Scenario

Housing is the basic need of the civilized living. Despite various efforts to solve the housing problem with various policies, there is a huge gap between the supply and the demand for the housing in Assam in general and Makum town in particular. The uncontrolled growth of population in urban areas due to migration and other factors have created a high magnitude of housing and infrastructure problem. Due to migration of rural population to the town, available vacant spaces in the urban areas are slowly being converted to unplanned, unhygienic built-up area. A section of population in Makum either have no place to live in or living under highly unhygienic, inhuman condition and deprivations. Lack of privacy, absence of minimum basic amenities, use of substandard building materials and unhygienic surroundings dominates the scene of settlements. In Makum, while the housing problem in the rural areas, by and large is qualitative in nature and the problem in the urban areas is largely quantitative.

Moreover, cost of land in the urban area is also increasing. People in the low- and middle-income group even find it difficult to acquire the land at the present prevailing cost. The housing pattern of Assam, including Makum region have living habits of such a kind that is different from other states and region of the country. There is a general feeling in Makum region that the basic problem is up gradation of existing units and there is very little need to be done to provide a roof for the utterly shelter less population as the category of such household is very negligible in the region.

An average household size in MMPA has 4.835 persons. The household size in urban area is (4.84 persons) and rural areas is (4.83 persons).

It is true that development of our country is dependent on the physical and mental health of the people. People who sleep on streets or who live in unhygienic houses cannot fully develop emotionally, intellectually, economically, culturally or as a family. In fact, inadequate and insecure shelter can lead to social and political instability which eventually hampers economic development of our country.

To address this problem, Government of India introduced a new Housing scheme in 2014 namely Pradhan Mantri Awas Yojana (housing for all by 2022). If this scheme does



works it would at least help to reduce India's major contribution with one of the highest homeless populations in the world. Under the PMAY, the main proposal was to construct 20 million homes for those people belonging to the low-income families and economically weaker sections in the identified urban and semi – urban areas by 2022. Accordingly, Makum Municipal Board is also working to provide houses to the poor as per guideline.

4.2 Housing Supply Mechanism

Housing supply is the main role of the State Government to improve living condition to the inhabitants either by directly providing houses or by financial assistance. The Government has adopted different policies to solve the housing problems especially for poor and low-income group. However, housing supply must address all social groups in the state including housing in urban areas, semi-urban areas and rural areas. In the recent years private buildings and developer's come forward to solve the problems of housing in urban areas of the state by constructing flat. Such practices have not been seen in Makum recently. In the rural areas of master plan a few houses has been constructed under centrally sponsored housing scheme. The plan recommends that State Housing Board or any other Govt. agency should come forward to build housing colonies at Makum for all sections of people of the state considering the present requirement.

4.3 Housing Condition, Type of Structure etc.

The following table shows the number and percentage distribution of population and household in respect of different living condition such as structure of house, source of lighting source of drinking water, type of fuel used for Cooking, Banking and Specified assets, Drainage connectivity and availability of kitchen.

TABLE NO.18
Distribution of households living in permanent, semi-permanent and temporary houses in 2011 for Makum master plan area

Name of Area	No. of Households	Permanent	%	Semi-Permanent	%	Temporary	%
Urban	3494	1830	52.37	1549	44.33	115	3.3
Rural	4703	1746	37.13	2122	45.11	835	17.76
MMPA	8197	3576	44.75	3671	44.72	950	10.53

Source: - Census of India 2011

FIGURE NO.19
Distribution of households living in permanent, semi-permanent and temporary houses in 2011 for Makum master plan area



FIGURE NO.20
Percentage Distribution of households living in permanent, semi-permanent and temporary houses in 2011 for Makum master plan area

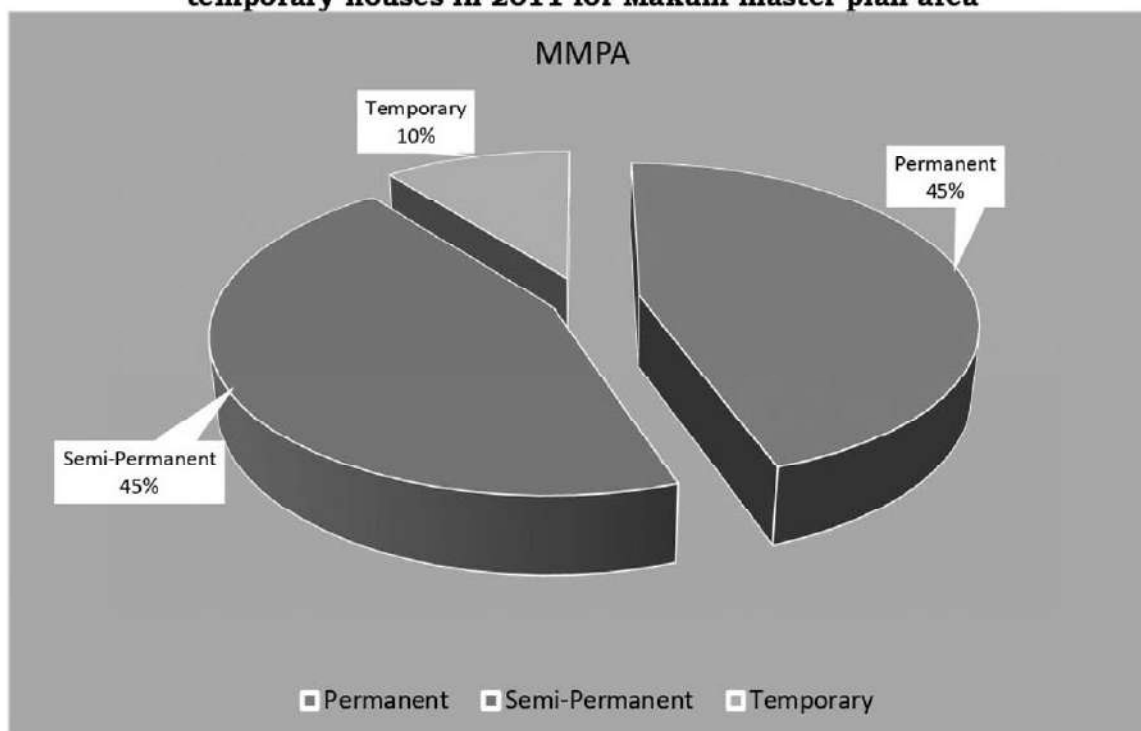


TABLE NO. 19
Number and % of households by main source of lighting in 2011 for
Makum master plan area

Source of lighting	Urban	Percentage	Rural	Percentage	MMPA	Percentage
Electricity	2982	85.35	2535	53.90	5517	67.31
Kerosene	498	14.25	2146	45.63	2644	32.26
Solar	5	0.14	6	0.13	11	0.13
Any other	4	0.11	6	0.13	10	0.12
No lighting	5	0.14	10	0.21	15	0.18
TOTAL	3494	100	4703	100.00	8197	100.00

Source: - Census of India 2011

FIGURE NO.21
Number of households by main source of lighting in 2011 for
Makum master plan area

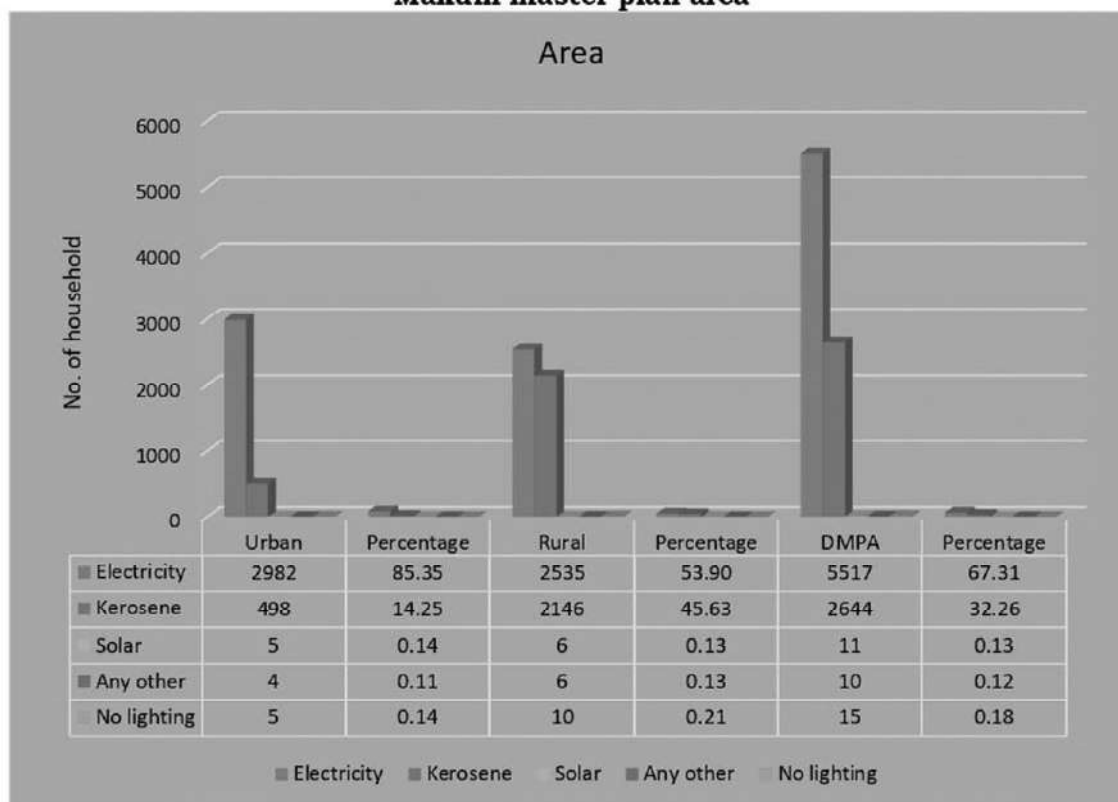


TABLE NO. 20
Number and percentage of households by main source of drinking water
in 2011 for Makum master plan

Source of drinking water	Urban	%	Rural	%	MMPA	%
Tap water from treated source	523	14.97	127	2.70	650	7.93
Tap water from untreated source	251	7.18	29	0.62	280	3.42
Covered well	10	0.29	21	0.45	31	0.38
Uncovered well	37	1.06	87	1.85	124	1.51
Handpump	1595	45.65	3264	69.40	4859	59.28
Tube well / Borehole	1056	30.22	1100	23.39	2156	26.30
Other Source	22	0.63	75	1.59	97	1.18
Total	3494	100	4703	100	8197	100.00

Source: - Census of India 2011

FIGURE NO. 22
Number of households by main source of drinking water in 2011 for
Makum master plan

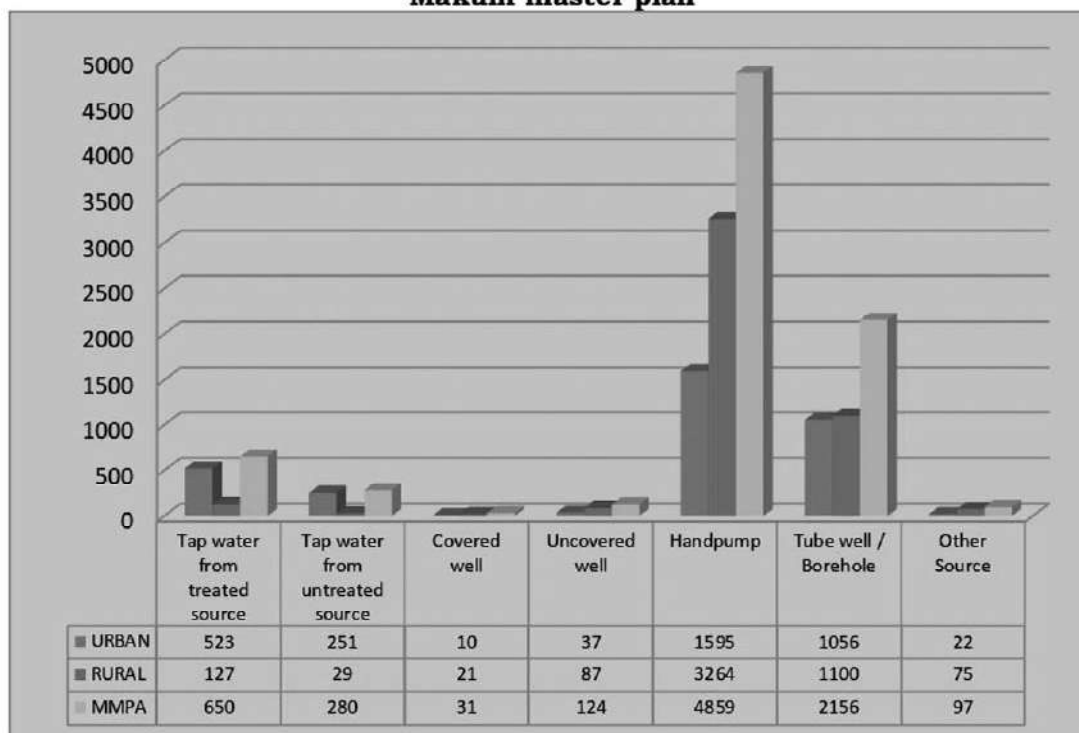


FIGURE NO. 23
Percentage of households by main source of drinking water in 2011
for Urban, Rural and Makum master plan

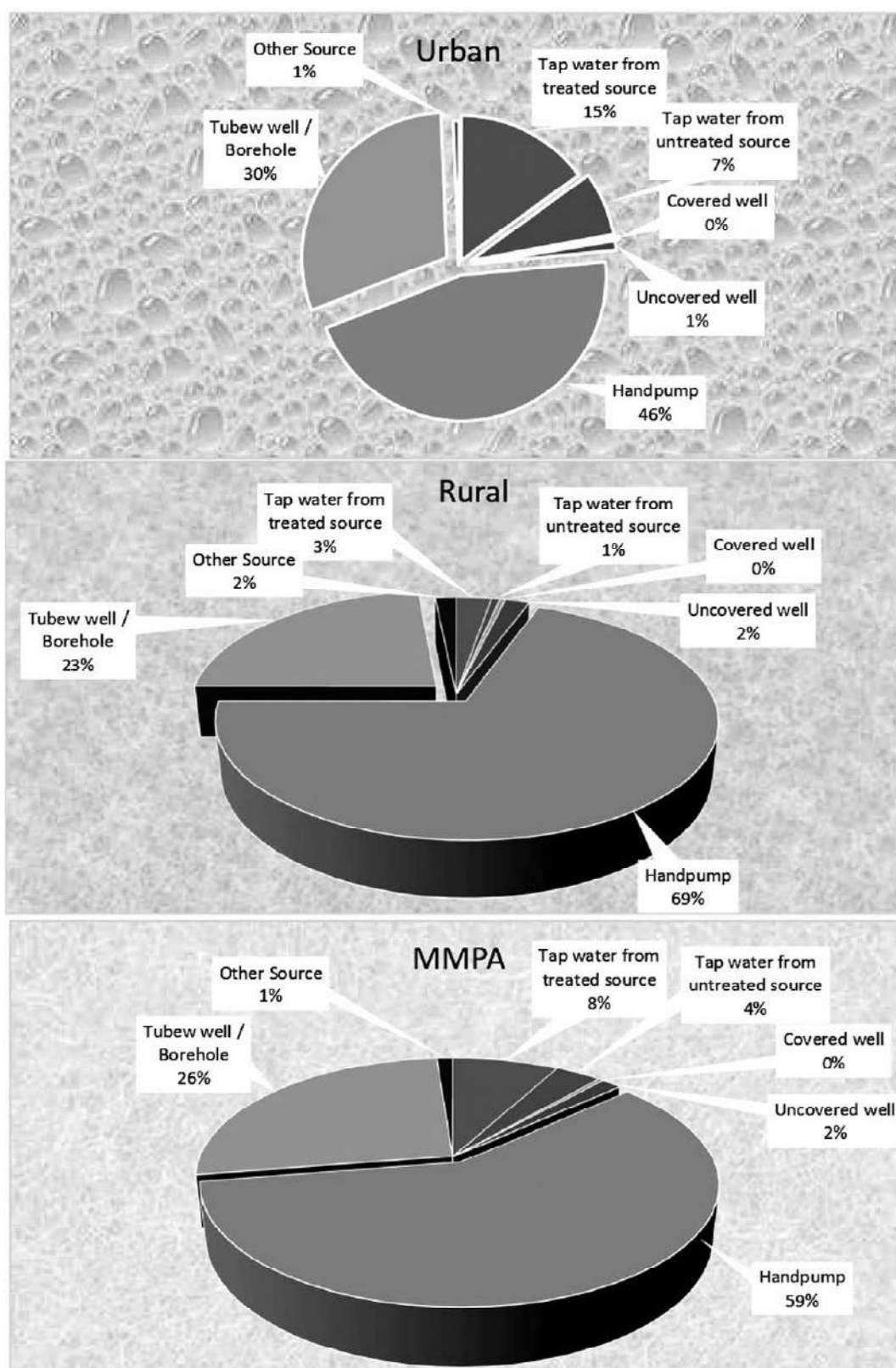


TABLE NO. 21
Number and percentage of households by type of fuel for cooking
in 2011 for Makum master plan

Type of Fuel used for cooking	Urban	Percentage	Rural	Percentage	Total	Percentage
Firewood	745	21.36	3902	82.97	4647	56.69
Crop residue	43	1.22	64	1.36	107	1.31
Kerosene	223	6.37	16	0.35	239	2.92
LPG/PNG	2445	69.97	705	14.98	3150	38.43
Any other	13	0.37	4	0.09	17	0.21
No cooking	25	0.71	12	0.25	37	0.45
TOTAL	3494	100	4703	100	8197	100.00

Source:- Census of India 2011

FIGURE NO. 24
Type of fuel for cooking in 2011

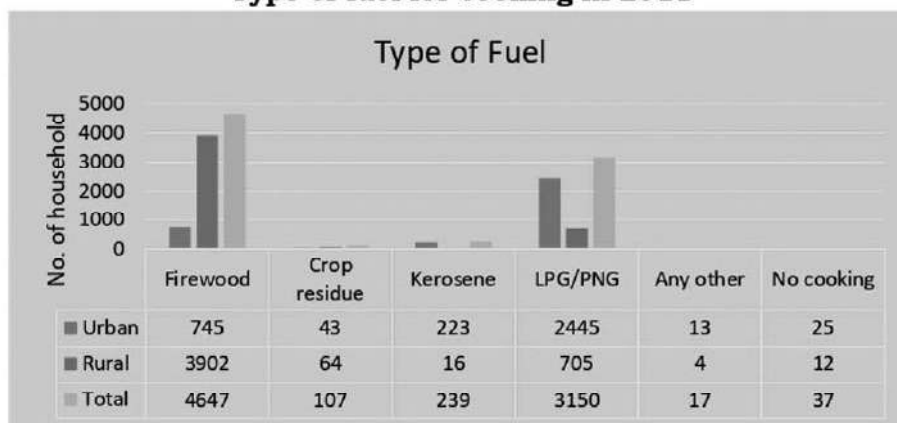


FIGURE NO. 25
Type of fuel for cooking in 2011 (%)

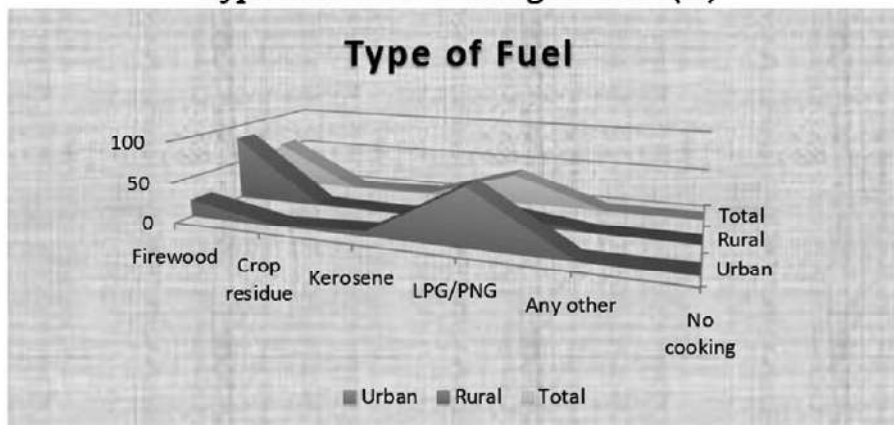


TABLE NO.-22

Number and percentage of households availing banking services and number of households having each of the specified assets in 2011 for Makum master plan

Banking services and specified assets	Urban	Percentage	Rural	Percentage	MMPA	Percentage
Total number of households availing banking services	2485	71.13	1950	41.46	4435	56.295
Radio/ Transistor	480	13.73	817	17.37	1297	15.55
Television	2334	66.8	1641	34.89	3975	50.845
Computer/ Laptop	465	13.31	320	6.81	785	10.06
Landline telephone	125	3.58	71	1.5	196	2.54
Mobile telephone	2397	68.61	1463	31.1	3860	49.855
Bicycle	2150	61.53	2999	63.76	5149	62.645
Scooter / Motorcycle/ Moped	628	17.96	416	8.85	1044	13.405
Car/Jeep/ Van	320	9.17	151	3.2	471	6.185
None of the specified assets	292	8.36	1068	22.7	1360	15.53

Source: - Census of India 2011

Figure No-26

Number of households availing banking services and number of households having each of the specified assets in 2011 for Makum master plan

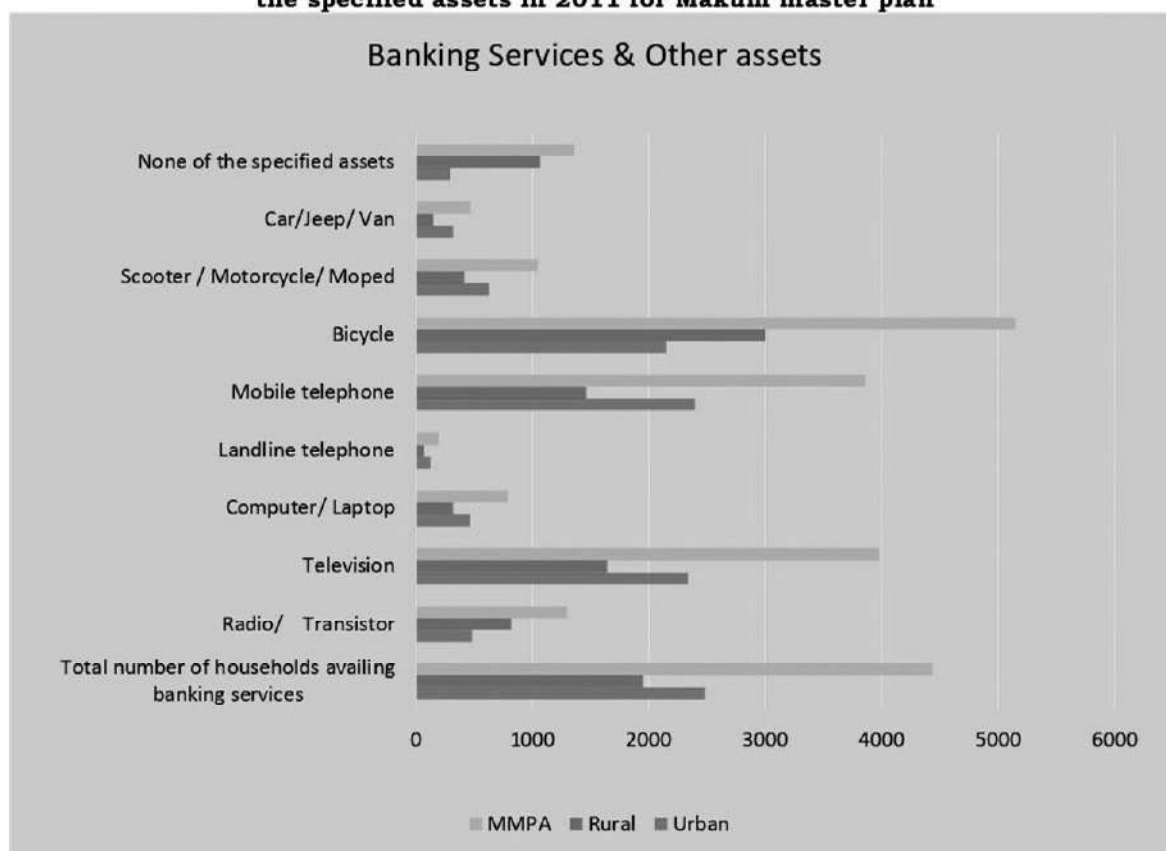


TABLE NO. 23
Number and % of households by type of drainage connectivity
for waste water outlet in 2011 for Makum Master Plan area

Type of Drain	Urban	Percentage	Rural	Percentage	Total	Percentage
Closed Drainage	554	15.86	119	2.53	673	8.21
Open Drainage	1797	51.43	1406	29.90	3203	39.08
No Drainage	1143	32.71	3178	67.57	4321	52.71
TOTAL	3494	100.00	4703	100.00	8197	100.00

Source: - Census of India 2011

FIGURE NO.27
Percentage of households by type of drainage connectivity
for waste water outlet in 2011 for Makum Master Plan area

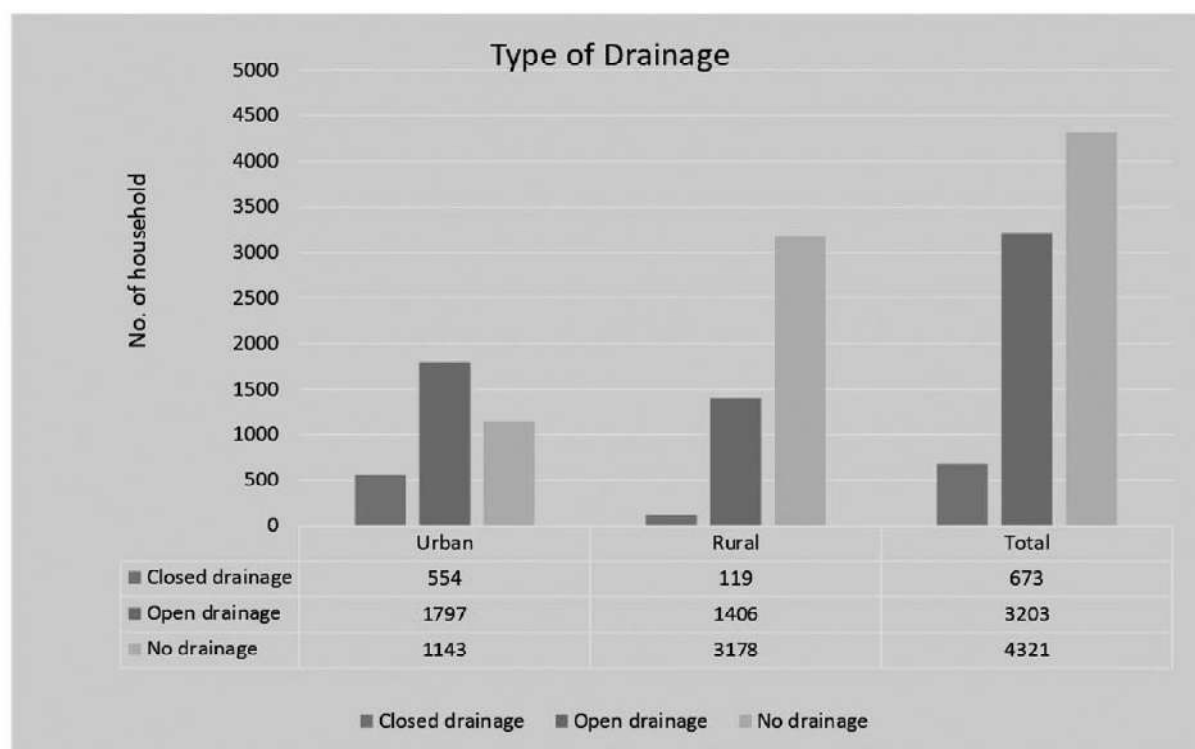


TABLE NO.-24
Number and % of households by availability of kitchen facility in 2011
for Makum master plan area

Cooking pattern		Urban	Percentage	Rural	Percentage	MMPA	Percentage
Cooking inside house	Has kitchen	3004	85.98	3974	84.50	6978	85.13
	Doesn't have kitchen	396	11.33	424	9.02	820	10.00
Cooking outside house	Has kitchen	49	1.40	179	3.81	228	2.78
	Doesn't have kitchen	21	0.60	115	2.45	136	1.66
No cooking		24	0.69	11	0.23	35	0.43
TOTAL		3494	100.00	4703	100.00	8197	100.00

Source: - Census of India 2011

FIGURE NO.-28
Number of households cooking inside house in MMPA in 2011

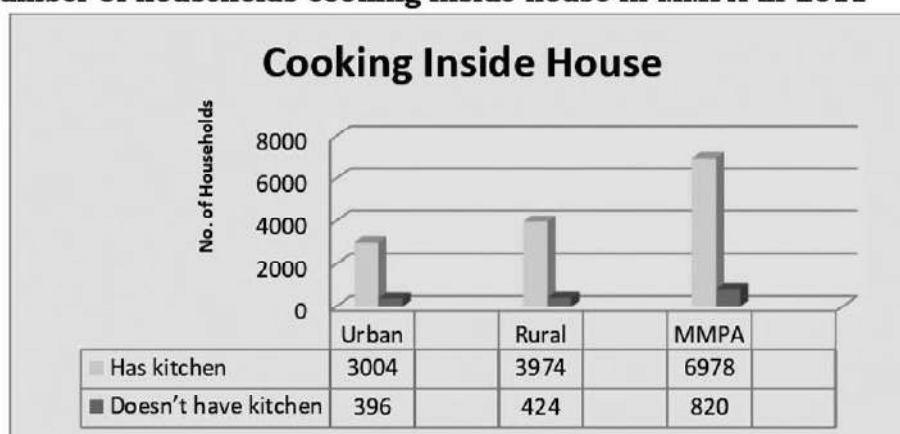
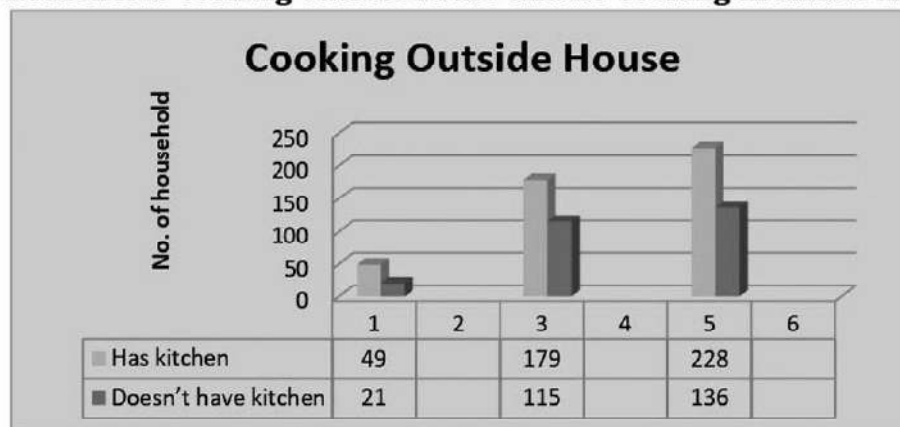


FIGURE NO.-29
Number of households cooking outside house and no cooking in MMPA in 2011



4.4 Slum-Squatters and informal housing share:

Urbanization can be defined as a process which reveals itself through temporal, spatial and sectoral changes in the demographic, social, economic technological and environmental aspects of life in a given society. Urbanization is a progressive concentration of population in urban unit. Urbanization is a process experienced in economically advanced as well as developing countries, cities and towns as centres of agglomeration, with fast economic growth and tertiary job opportunities. In developing countries, the rate of urbanization is very fast and it is not accompanied by industrialization but by the rapid growth of service sector in the economies. During the last three decades, rapid urbanization has been one of the most crucial socio- economic changes of our societies. As population grows more and more, people move into the cities in search of a better life, causing more housing shortage, paucity of civic amenities leading to poverty and in the process creating bigger slums in cities.

But even where urbanization is still low, people are moving to towns and cities. The new arrivals and many long-term residents too are crowded together in over populated houses, dismal tenements and teeming slums. With the growth of cities, the cost of housing and infrastructure is increasing on the one hand and lack of affordable housing facility on the other hand. These have often forced the urban poor to rely on or create their own informal infrastructure, giving way to dramatic growth of slums in urban centres.

Urbanization might also force some people to live in slums when it influences land use by transforming agriculture land into under areas and increase the land value. During the process of urbanization, some agriculture land was used for additional urban activities. That is why as urbanization grows slums also grow in India as well as Assam at a faster rate. As an observation, most of the small Indian towns are much congested and unhygienic although their effect on an individual is mitigated by the openness of the environment.

As per information received from Makum Municipal Board, there is no notified slum pockets in the municipal area, in spite of that there is every possibility of the creation of slum in the town near future due to the increase of the population and industrialization and as such it is necessary for the concern authority to stop such informal habitat in future.

4.5 Housing Stock, Shortage and Need Assessment

There are about 3494 nos. of houses within urban area and 4707 nos. of houses in rural area of Makum master plan in the year 2011. As a whole in master plan area the number of households are 8197 nos. Since there are 39676 persons in MMPA in the year 2011 and the above housing figure shows that an average of 4.84 persons per household.

To find out the housing requirement for future, a detailed study of family size level of obsolescence, existing shortage etc. are necessary. However, on the

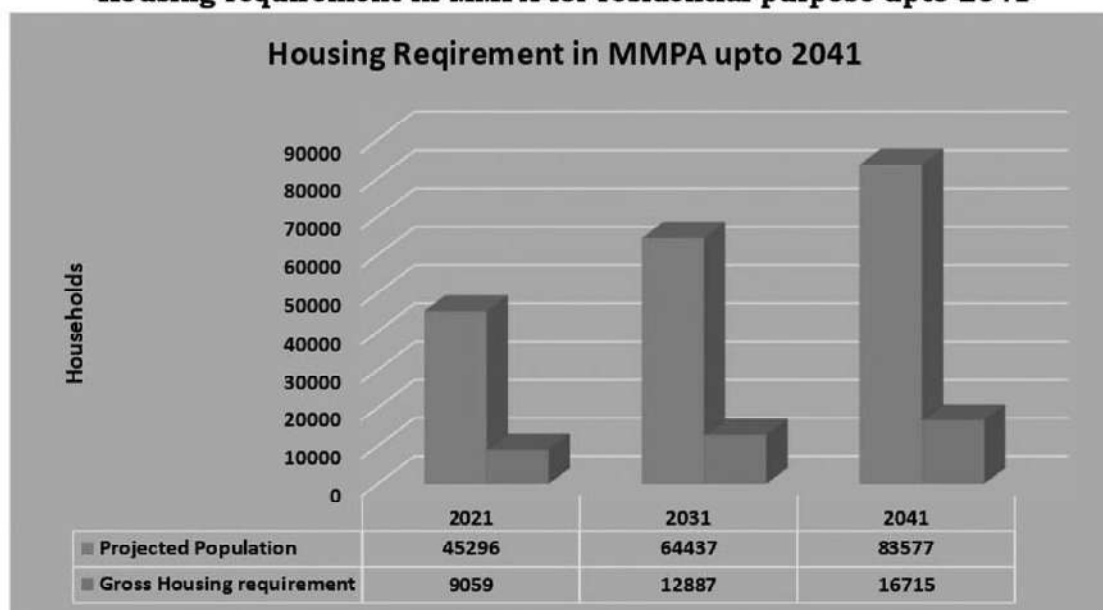
basis of projected population and household size of 5 persons the gross housing need is assessed below:

TABLE No-25
Housing requirement in MMPA for residential purpose upto 2041

Year	Projected Population	Additional Housing Requirement	Gross Housing
2011	39676	-	8197
2021	45296	862	9059
2031	64437	3828	12887
2041	83577	3828	16715
	Total	8518	

Source: -Calculated by TCP, Dibrugarh

FIGURE No.30
Housing requirement in MMPA for residential purpose upto 2041



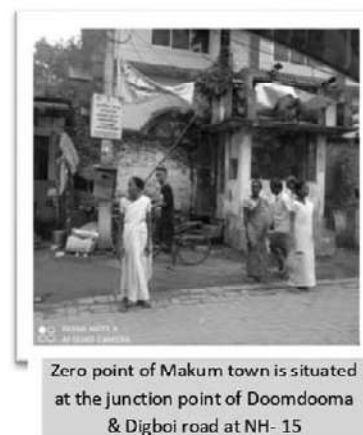
Since 8197 nos. of houses have been used for residential purposes in 2011 in Makum master plan area and the above table reveals that gross housing requirement in the year 2021 was 9059 no. of houses. As such, in the year 2021 itself the additional requirement of housing for the population of 45296 was 862 nos. of houses in addition to existing houses and up to the year 2041 additional housing requirement will be 8518 nos.

- (i) Optimum use of the existing transportation system through improved traffic operation and controls.
- (ii) Improvement of the existing road network through strengthening and widening.
- (iii) Improvement of Railway level crossing.
- (iv) Improvement of NH- 15 and T- Type bridge at NH- 15 & 315.
- (v) Provision for adequate parking facilities.
- (vi) Development of new roads and other transport facilities.
- (vii) Makum Municipality has classified its roads in three categories Principal Road, Main Road & Other Road.

5.2 Overview of Critical Roads and Improvements

Makum is well connected with the rest of the country by roads and railways. The N.H.- 15 and NH-315 have connected Makum with other places as shown below: -

- a) Makum to Tinsukia
- b) Makum to Doomdooma, Talap & Chapakhowa
- c) Makum to Digboi, Margherita and Ledu
- d) Makum to Roing via Chapakhowa
- e) Makum to Dibrugarh via Tinsukia
- f) Makum to Namsai via Kakopothar



Zero point of Makum town is situated at the junction point of Doomdooma & Digboi road at NH- 15

Makum is also connected with railway network from Makum & Tinsukia. Beside train plying of taxis, buses, winger and trucks are playing a major role in transporting passengers and goods to and from Makum.

Makum town has gained importance in the field of tea-industry and business owing to tea and other industries and also meeting point of different towns. This has resulted in to increase of vehicles on the roads of Makum town. On the other hand, a good number of ASTC buses, private buses and winger ply through the town. The buses and small vehicles plying through Makum town follow the following routes:

- a) Roing of Arunachal Pradesh to Tinsukia, Dibrugarh via Makum.
- b) Namsai to Tinsukia-Dibrugarh via Makum.
- c) Night services to Guwahati from Margherita, Digboi, Doomdooma, Namsai via Makum

A well laid transportation network solves majority of the urban issues and increases the efficiency of the town.

Recommendation of the road network is made as per the **IRC guidelines** and in accordance with the provisions of **“THE ASSAM PUBLIC WORKS (REGULATION OF ROAD DEVELOPMENT AND ROAD TRANSPORT) ACT-2010”** with recommendation that all new road proposal should have utility duct.

The plan recommends development of road infrastructure as per table given below:

TABLE NO:-26
CATEGORY OF ROADS

Category of roads	Name / Critical Road (C)	Existing With	Recommended width
		(in Meter)	(in Meter)
Major	Assam Trunk Road (NH-15)(C)	15	24
	NH-315Digboi Road(C)	18	24
Arterial	Betjan Road(C)	7	10
	Chandmari Road	8	10
	Loharipatty Road	5	8.5
	Thana Road	7	10
	TengaPani Road	10	12
	Jyoti Nagar Path	12	15
	Hebeda Line Road	5	8.5
	Gandhi Nagar Road	8	10
	Hebeda Road	8	10
Sub- Arterial	Oil Field Road	12	15
	Sankerdev Nagar Main Road	5	8.5
	Sanibari Road	7	10
	Navin Nagar Road	4.5	8.5
	GBC Road	5.4	8.5
	Kumhar Patty Road	6	8.5
	13 no line Road	5.4	8.5
	Chinapatty Road	5.4	8.5
	Tarun Nagar Road	3.3	6.6
	Railway School Road	6	8.5
	Krishna Nagar Road	8	10
	Subash Nagar Road	5.4	8.5
	New Gandhi Nagar Road	7	10
Other Road	All other roads not mentioned above		Min 8 & 4.5 for single plot

Source:-Prop. By T&CP, Dibrugarh

5.3 Bus Transport Terminals

There is no organized public bus stand in Makum and generally public buses stop at the side of NH-15 & NH 315. Even informal auto stands were observed in Makum town and located at 1) Makum Motors Petrol Pumps 2) Indian Oil Petrol Pump 3) Betjan Road 4) Makum Digboi Road Forest Training Center 4) Tegapani Road 5) Makum Railway Station. These stops serve intra - urban traffic, i.e. regional traffic but create lots of traffic congestion in the area



Indian Oil- NH15 (Auto Stand)



NH- 15 Near Rly Station(Auto Stand)



Hebeda Road (Auto Stand)



Betjan Path(Auto Stand)



Tegapani Road (Auto Stand)



*NH- 15 Chota Hati (Auto Stand)
Near Indian Oil Petrol Pump*



Makum Digboi Rly Crossing (Auto / Bus Stand)

In Makum town the surface condition of the road is up to the mark. But roads appear to be incapable of taking additional traffic load. Access roads are narrow with poor surface. Most of the traffic is generated from Makum Motors Petrol Pump to the point of Makum Digboi level crossing and another traffic generated due to level crossing at Makum Digboi road. But the entire area does not have organized parking space.



*Makum Doomdomma Road near
Rly station*

Keeping in view the above, the plan recommends A.S.T.C. Bus station and public bus stands at Makum Junction Gaon by the side of Makum By pass Road.

5.4 Freight Zones Logistics

Presently there is no truck terminus at Makum. So, the plan proposes one truck terminus at Makum Junction Gaon by the side of Makum By pass Road.

5.5 Footpaths and Bicycle Tracks

Footpaths are normally designed for pedestrian for pleasant and comfortable walking. In Makum except at Betjan road to GBC road, there is no any footpath in other roads of the town. There is no cycle track in the town.

Exclusive lane for slow moving vehicles, pedestrians along with spaces for street vendors are also essential for overall development of a town. The hawkers and street vendors also play an important role in urban economy. The notification of vending and no vending zone by the authority is mandatory as per the provisions of the Street Vendors Act, 2014. This improves the capacity of the lanes designed for motorized vehicles and increases the safety of slow-moving vehicles and pedestrians

The plan suggests construction of footpath in both sides of all the roads in the town by the concerned authority. The plan also earmarks cycle track in Makum-Doomdooa By Pass Road from Makum ROB.

The width of footpath as per URDPFI guidelines is follows:

TABLE NO: -27
WIDTH OF FOOTPATH

Sl. No.	Description	Width(mtr)
1	Minimum free walkway width in residential/mixed use areas	1.8
2	Commercial/Mixed Use Areas	2.5

The URDPFI Guideline for cycle /NMT track is given in the following table:

TABLE NO: - 28
CYCLE TRACK

Sl. No.	Arterial Roads	SUB Arterial Roads	Distributary Road	Access Roads
Non-Motorized Vehicle	Segregated cycle track	Segregated cycle track	Cycle lane	Mixed/traffic
Location	Between carriageway or street parking and footpath on either edge of the carriageway	Between carriageway or street parking and footpath on either edge of the carriageway	On the edge of the carriage, adjacent to the footpath or parking	Not applicable
Gradient	1:12-1:20	1:12-1:20	1:12-1:20	1:12-1:20
Lane width	2.2 to 5.0m	2.2 to 5.0m	2.2 to 5.0m	Mixed with motorized vehicular traffic
Minimum width	2.5 for a two-lane cycle track and 1.9m for a common cycle track and footpath	2.0 for a two-lane cycle track and 1.7m for a common cycle track and footpath	1.5m	1m(painted)

5.6 Parking

At present, there is no organized parking space for the cars, two wheelers in the market area. The cars are generally parked on the main road of the town. The roads are already overcrowded with traffic and further encroachment on road surface by cars and two wheelers has resulted obstructed traffic congestion.



Parking problem NH- 15 near Rly station



*Traffic Congestion at NH- 315 near Rly
Crossing Makum Digboi Road*

The recommended equivalent car space (ECS) required for different type of vehicles as per **URDPFI** guidelines are given in the following table for design of parking areas

TABLE NO:-29
PARKING SPACE

Sl. no.	Vehicle type	ECS
1	Car /taxi	1.00
2	Two-Wheeler	0.25
3	Auto Rickshaw	0.50
4	Bicycle	0.10
5	Trucks/Buses	2.5
6	Emergency Vehicles	2.5
7	Rickshaw	0.8

5.7 Areas with Major Traffic congestion & Parking issues, Accident prone area

The maximum inter -town traffic volume is generated on the road starting from Makum Motor Petrol pump and moving towards Makum level Crossing and towards Digboi. This is the most vital link for the town. The second inter town traffic generating road is Makum railway crossing towards Makum railway station.

The presence mixed traffic on narrow roads has accelerated traffic congestion in NH- 15. The town has mainly two accident prone areas, namely the junction point at NH-15 railway crossing and Makum State Bank and another at Bishnu Nagar NH- 315. Proper road signage and marking in the road in these areas is the need of the hour.

5.8 Improvement of Rotary & Junctions

Improvement of all road junctions as per IRC guidelines is urgent and important for improving the traffic scenario. For smooth traffic in NH-15 and roads leading towards Doomdooma town, this plan proposes a T-type fly-over at the junction point of NH-15 railway crossing from Tinsukia town towards Doomdooma town and Digboi NH- 315.

5.9 Signage, Availability & Requirement

The ULB, traffic and other concerned departments will assess the requirement of Signage and accordingly install the signage as per the rules and regulations for the beautification of the town as well as smooth flow of traffic and public convenience.

5.10 Fixation of Road level in Makum master plan area

As per city planning norms, road levels must always be lower than that the adjoining properties they serve. Since plinth levels of once constructed building don't change (unless they are demolished under reconstruction), it should be obligatory on the part of appropriate authority to ensure that road/lane levels are not raised unnecessarily as and when they are resurfaced in subsequent years. Since this aspect is not being judiciously taken into account usually by the executing agencies during road repairs many old buildings in our cities & towns which were constructed 20-30 years ago are now at the same and in few cases even

below adjoining road levels which have been raised arbitrarily without evaluating their resultant impact on these adjoining areas serve by this road network.

In most well governed cities of the world, road level once fixed at the time of their initial construction remain usually same and are not tempered with later on.



Accordingly, the plan suggests the concern authority to use contour map and present HFL – 120.97 (M) for fixation of road level in master plan area. The plan proposes for installation of post for fixation of road level by PWD (R).

➤ **Fixation of plinth level should be done based on the following :-**

Works department like PWD (R), NH etc. shall erect permanent posts at suitable location / land mark points and at road intersection point depicting the RL of road and HFL of that area carried out from nearest Railway platform or from other specific location where bench mark from Mean Sea Level -MSL (is) recorded so that the same can be taken as bench mark for fixation of plinth level of buildings of near by areas.

The maximum allowable height of plinth is RL of adjoining road + 0.75 mtr.

However, roads where HFL is above road level, the road level for fixation of plinth height shall be considered as HFL and in cases where road level is above HFL, the existing road level shall be considered as final road level of fixation of plinth height.

5.11 Major Proposals

- I. One truck stand & Bus Stand is proposed at Makum Junction Gaon and the area is earmarked in the proposed land use map.
- II. This plan proposes a T-type Railway over bridge at the junction point of NH-15& 315& another railway over bridge at NH-315 (Near Asomiya Balijan Gaon) connecting ring road.
- III. Considering the scenic beauty of the town, the plan recommends plantation along the major roads and development of traffic points to augment the aesthetic beauty of the town.
- IV. This plan proposes a cycle track in Makum Doomdooma By Pass Road from Makum Flyover.
- V. Fixation of road level in master plan area.
- VI. The plan proposes a ring road on southern part of Makum Master plan from Hebeda Road (Near Civil Hospital) connecting to Digboi Road (NH-315)
- VII. This plan also proposes a walking track in the master plan in two locations (a) Around Forest training center (b) Jyoti Nagar road
- VIII. This plan also proposes two rotary (a) Junction point of Digboi- Jyotinagar chariyali (b) Junction point of Betjan – Makum By pass

CHAPTER 6

6 INFRASTRUCTURE, PUBLIC UTILITY & SERVICES

6.1 Physical Infrastructure

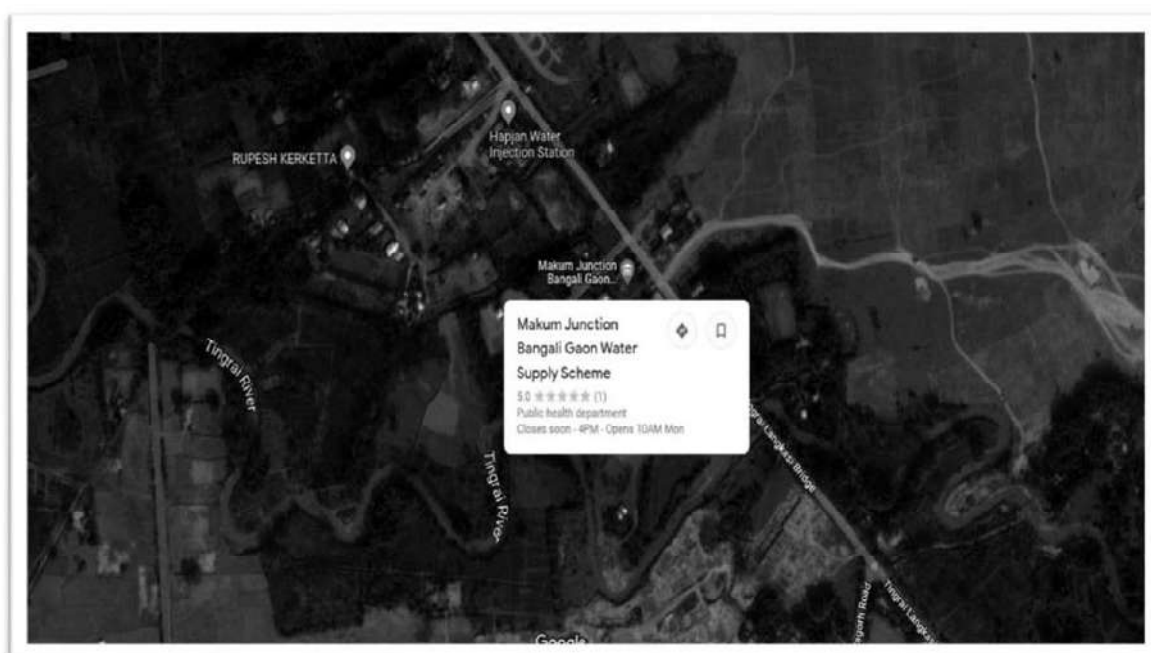
6.1.1 Water Supply

For the rest of the town and rural areas, the only source of water is tube well and the ring wells as ground water and surface water is readily available at Makum and its adjoining areas. Though the tube well and ring well are efficiently functioning, it will no longer be considered as free from contamination due to presence of a number of pit latrines. A comprehensive water supply scheme with treatment plant covering the population up to 2041 is the need of the hour.

The objective of a public protected water supply system is to supply safe and clean water in adequate quantity, conveniently and as economically as possible. Rising demand of water due to rapid urbanization is putting enormous stress while planning the water supply system for an area; it is evident to consider water conservation aspects, which may be possible through optimal use of available water resources, prevention and control of water and effective demand management. Presently, there are 3 (three) nos of water supply scheme including 1 (One) No. of water treatment plant in Makum town and under process of laying the pipeline for 16 Km within Makum town.



Makum town Water treatment & Water Supply Scheme at Hebada Line Road



Tengapani Road Water Supply Scheme



Makum Junction Bongali Water Supply Scheme

6.1.2 URDPFI Guideline's for Water Requirement

As per URDPFI guidelines the norms for water requirement for institutional buildings are given below: -

TABLE NO-30
REQUIREMENT FOR INSTITUTIONAL BUILDINGS

Sl.No.	Institutions	Litres per head per day
1.	Hospitals (including laundry)	
a)	No. of beds exceeding 100	450 (per bed)
b)	No. of beds not exceeding 1000	350 (per bed)
2.	Hotels	180 (per bed)
3.	Hostels	135
4	Boarding Schools	135
5	Restaurants	70 (per seat)
6	Day school / colleges	45
7	Offices	45
8	Cinema, concert halls and theatre	45

In addition to the above the fire- fighting water demand is also as a function of population. It is desirable that one-third of firefighting requirements from part of the service storage. The balance requirement may be distributed to several state tanks of strategic points. These strategic points may be filled from nearby pond streams or canals by water tankers wherever feasible.

The plan also recommends preparation of a comprehensive potable water supply scheme as per guideline of CPHEEO manual of Govt. of India to cater the needs of the estimated population of 83577 up to 2041 by a competent authority.

6.1.3 Drainage system

The drainage system differs in Makum Municipal Board area and rural areas within master plan. The drainage system in Makum municipal area is relatively good as compared to rural areas.



No Drain at NH- 15



No Drain at NH- 315 MakumDigboi Road

The existing natural drains of master plan area are not properly defined and are slowly being encroached by the growing population. The existing drainage of these areas does not have a proper slope resulting in water logging at different areas during rainy season. Most of the drains in rural areas of master plan are kutchra drains and not link up with natural channels and also do not have sufficient cross section to drain out surface water after heavy

shower. As such, it is an urgent necessity of Makum Municipal Board and concerned authorities to construct few drains at certain location of the town and in rural areas to drain out storm water. It is also important on the part of MMB for the development of the existing natural stream which is running through the town for removing the water logging problem in the town as well as in residential areas. The existing infrastructure conditions of the town reveals that the priority of the town is an efficient storm water drainage system whereby storm water that accumulates within the populous localities and commercial areas and drained out through scientifically designed storm water drainage system. This plan also recommends hierarchy of drainage system for the entire master plan area because almost 52.71% households in the master plan area still not connected with the drainage system. As such, it is necessary to prepare a Drainage master plan for Makum by the concerned authority to solve the problem of storm water and water-logging in the town and its adjoining areas.

The plan proposes **2 (two) Effluent Treatment Plant** in Amguri gaon and Makum Junction Bongali gaon 1st Part of master plan area. Also, proposal given for **Faecal Sludge Treatment Plant** at Makum Junction Bongali gaon 1st part.

RECOMMENDATION :-

- ✚ The plan recommends grid pattern development so that rain water reaches the outlet
- ✚ Urgent steps for preparation a map showing flow direction, area of congestion and connectivity and also to take necessary action.

6.1.4 Sanitation

In Makum urban area almost 65.77% household use septic tank and in rural area only 21.52% households use septic tank in 2011. In the master plan area as a whole the percentage of households use septic tank are 40.38%. In the master plan area, almost 35.94% household use pit latrine without slab which are not conducive for health and environment. This type of condition is prevailed in all over India. As such, The Government of India in the year 2014 introduced the Swachh Bharat Mission (SBM) which is being implemented by the Ministry of Urban development and Ministry of Drinking and sanitation for urban and rural areas respectively. The main objective of the mission is – Elimination of open defecation, Eradication of manual scavenging, Modern and scientific Municipal Solid Waste Management, to effect behavioural changed regarding healthy sanitation practices, generate awareness about sanitation and its linkage with public health, capacity Augmentation for ULB's.

Swachh Bharat Mission (SBM) will improve the health conditions of every Indians. This practice will be able to prevent many types of diseases in the country and we will be able to have a happy and healthy society. SBM can be able to build a better eco-friendly environment in the country and can give better life to our upcoming generations.

SBM will also help in generating employment through tourism and boos India's Gross Domestic Product (GDP).

Unhygienic condition's is one of the major root courses of diseases/illness. Any disease or illness has financial impact both in terms of expenditure and potential revenue earning. As such, SBM will have positive impact on India's

health care sector. SBM will plug the loss due to unhygienic and lacks of cleanliness and will help to ease burden on existing health care facilities.

SBM will lead to Health India which in turn increases productivity of Indians. High productivity means high earning potential. Under current economic conditions, India desperately need Foreign Direct Investment (FDI) for this the country must be clean.

SBM will benefit socially and financially each & every citizen of India. If we want financial growth then we have to collectively make SBM a roaring success in future. SBM is one of the critical links towards economic success of India.

Under SBM it is estimated that about 20% of the urban household in towns, who are currently practicing open defecation are likely to use community toilets as a solution due to land and space constraints in constructing individual household latrines. For this component beneficiaries shall be groups of households in urban area whose members practice open defecation and who do not have access of two household toilets and for whom the construction of individual household toilet is not feasible.

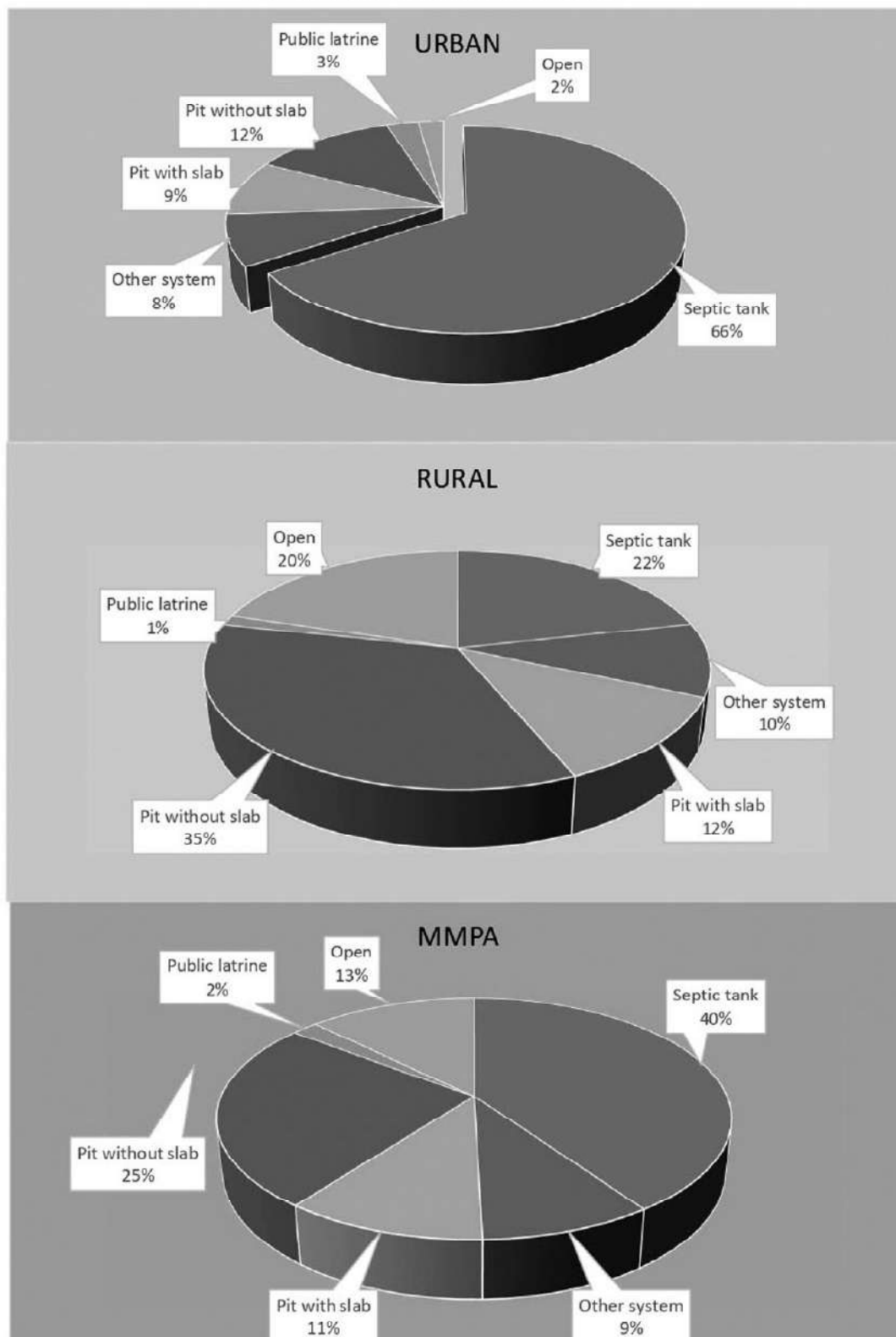
Under SBM, ULB's will ensure that a sufficient number of public toilets to be constructed in the town. All prominent places within the town attracting floating population should be covered. Cares should be taken to ensure that these facilities have adequate provision for man, woman and facilities for the disabled (e.g., ramp provision, Braille signage etc.) wherever necessary.

TABLE NO: -31
Number and % of households by type of latrine
in 2011 for Makum Master Plan area

Type of Latrine		Urban	%	Rural	%	MMPA	%
Flush / Pour latrine	Septic tank	2298	65.77	1012	21.52	3310	40.38
	Other system	283	8.10	470	9.99	753	9.19
Pit Latrine	Pit with slab	304	8.70	571	12.14	875	10.67
	Pit without slab	436	12.48	1635	34.77	2071	25.27
No latrine without premise	Public latrine	97	2.78	65	1.38	162	1.98
	Open	76	2.18	950	20.20	1026	12.52
TOTAL		3494	100.00	4703	100.00	8197	100.00

Source:- Census of India 2011

FIGURE -31
Percentage of households by type of latrine in 2011
for Makum Master Plan area



URDPFI Guidelines for Public Toilets

The general standard for public toilets in public area and modified norms for public toilets in public places and roads recommended in URDPFI guideline are given below: -

TABLE NO:-32
NORMS FOR PUBLIC TOILETS IN PUBLIC AREA.

TYPE	NORMS FOR TOILETS
Public toilets	On road and for open areas every 1 Km. including parks, open air theater, car parks and fuel station. Toilets shall be disabled friendly and in 50: 50 ratios (M / F)
Signage	Signboards on main streets shall give directions and mention the distance to reach the nearest public convenience of visitors. Helpline number shall be pasted on all toilets for complaints / queries
Modes	Pay and use or free in pay and use toilets entry is allowed on payment to the attendant.
Maintenance / Cleaning	The toilets have both men and women attendants. Alternatively automatic cleaning cycle covering flush, toilet bowl, seat, hand wash basin, disinfecting of floor and complete drying after each use can be adopted. Public toilets shall be open 24 hrs.

The urban local body can follow the above norms for construction the public toilet and maintenance thereafter.

6.1.5 Sewerage Network

Like the rest of the towns of the state, Makum also does not have sewerage network and treatment plant. Human night soil is generally disposed at conventional septic tanks or low-cost sanitary pits. Till the execution of the sewerage scheme, it is recommended to encourage the people to construct sanitary latrines of their own and to cover poor families under Swachh Bharat Mission. The use of service latrine should be banned as per law for the health and hygiene of the community

6.1.6 Solid Waste Management

Solid Waste Management (SWM) is a process which involves collecting and disposing of solid wastes is unavoidable by products of human activities

Municipal Solid Waste (MSW) in India which includes garbage, metals, bottle or glass, plastics, paper and fabric have been increasing in recent years because of population increase, rapid urbanization, technology and improper through-way culture of people. In general, the MSWM is the collection, treatment and disposal of solid waste generated by all categories of Municipal population in an environmentally, friendly and socially satisfactory manner using the available resources most efficiently. Urban bodies are generally responsible for providing the SWM services and nearly all local government laws give exclusive mandate of collecting all the wastes disposed outside homes or establishments. Effective solid waste collection and disposal is a vital component of public service provisions and should take priority particularly in emerging towns. Because, failing to have such services can result in many unfavorable outcomes in the long run and this may have serious adverse effect on public health and the environment.

The generation of solid waste has become an increasing environmental and public health problem in every urban area of India. The most urban areas of India rapid urbanization and population growth has produced tremendous amounts of solid and liquid wastes that degrade the environment and destroy the resources. In the past, most policies and frameworks governing solid waste management in India have been directed at the service providers and less attention has been paid to the demand side aspect of the problem. As such, in present environmentally safe and ethical solid waste management system in Makum town and its adjoining areas must be justified. Makum town is growing very rapidly in recent years. Unplanned growth and development of the town in recent years and environmentally unsafe disposal of urban solid waste by residents of some parts of the town over the last two decades have been a major cause of the life threatens health hazards in the town. Makum Municipal Board with an area of 3.66 Sq. Km. generates a sizeable amount of waste daily. Thus, under such circumstances it is very essential for environmentally safe and hygienic solid waste management system in the town in order to explore the possibility of community participation for a better Municipal Solid Waste Management System (MSWMS).

Presently, in Makum town 4.5 to 5 metric ton solid waste generate daily and dump at **Tinsukia-Duliajan road near LBT road**, No.2 Potia Pathar about 11 Km from the heart of Makum town. The Makum municipality have 1(one) dumper, 4 (four) Chotta Hati, 2 (two) robots, for door-to-door collection involving 30 persons for waste collection in Makum town.



Present garbage collection point at Tengapani Road near Rly Crossing

The Makum municipality having following equipment's and manpower for solid waste management works as mentioned below.

Sl.No	Equipment's / Manpower	Numbers
1	Big Truck (T ata 407 tripers)	2
2	Mini Tripper Hydraulic	2
3	Chota Hati	2
4.	E- Rickshaw tripper	10
5.	Hand Cart	4
6	Tri- Cycle	15
7.	Chest pull cleaner	1
8.	Manpower	30

NOTE :- There is one transfer station at junction of NH- 315 / railway crossing.

RECOMMENDATION :-

SCIENTIFIC WAY OF COLLECTION OF GARBAGE & DISPOSAL AS PER SOLID WASTE MANAGEMENT RULE, 2016

Further, a few steps for scientific solid waste management system in master plan area includes segregation of bio-degradable and non-biodegradable solid waste at source, construction of compact pits at all residential houses in order to produce compost wherever feasible, introduction of specific litter bins for collection of segregated bio-biodegradable and non-biodegradable solid waste for soil conditioning and recycling purpose respectively, and doing away with the system of dust bins along roads which is a major cause of pollution.

The duties and responsibilities of ULB's as per revised Solid Waste Management rules of 2016 are given below:

- (i) The ULB's shall prepare a Solid Waste Management plan as per state policy within six (6) months.
- (ii) Arrange for door-to-door collection of segregated solid waste; integrate rag pickers/informal waste collectors in solid waste management.
- (iii) Frame bye-laws incorporating the provisions of these rules within one-year, prescribed user fee.

- (iv) Direct waste generators not to litter and to segregate the waste at source and handover does aggregated waste to authorized waste pickers, the waste collector authorized by the ULB.
- (v) Set up material recovery facilities or secondary storage facilities and provide easy access to waste pickers and recyclers for collection of segregated recyclable waste.
- (vi) Established waste deposition centre for domestic hazardous waste and ensure safe storage and transportation of the domestic hazardous waste to the hazardous waste disposal facility or as may be directed by the state pollution control board.
- (vii) Direct street sweepers not to burn tree leaves collected from street sweeping and store them separately and hand over to the waste collectors or agency authorized by ULB.
- (viii) Provide training on solid waste management to waste pickers and waste collectors.
- (ix) Promote setting up of decentralized compost plant or bio – meth nation plant at suitable locations in the markets or in the vicinity of markets ensuring hygienic conditions.
- (x) Collect separately waste from sweeping of streets, lanes and by-lanes daily or on alternate days or twice a week depending on the density of population, commercial activity and local situation.
- (xi) Involve communities in waste management and promotion of home composting, bio – gas generation, decentralized processing of waste at community level subject to control of odour and maintenance of hygienic conditions around the facilities.
- (xii) Educate workers including contract workers and supervisors for door-to-door collection of segregated waste and transporting the unmixed waste during primary and secondary transportation to processing or disposal facility.
- (xiii) Ensure that the operator of a facility provides personal protection equipment including uniform, fluorescent jacket, hand gloves, rain coats, appropriate foot wear and masks to all workers handling solid waste and the same are used by the work force.
- (xiv) Create public awareness on solid waste management.

6.1.7 Electrical Sub –Station and Major Transformers

Power requirement of Makum master plan area is meeting by the ASEB grid. In 2011, there are 2982 electric connections i.e., almost 85.35 % in urban area

and 2535 electric connections i.e., almost 53.90% in rural area. In the master plan area as a whole there are 5517 electric connections i.e., almost 67.31% in the year 2011. Presently there are 2 (two) electric power substation located at Tegapani road and near Ganga bari Tea Estate. Since the projected population of Makum master plan will be 83577 (approx), as such consumptions will be increasing at a fast rate due to increase of population as well as modernization of home appliances, it is necessary for the APDCL to make necessary arrangement of power supply to fulfill the consumption demand of the people. The plan also recommends under ground transmission of power lines to stop pilferages and ugly look of transmission lines.



Electric sub-station atTengapani Road, Makum town

6.2 Social Infrastructure

6.2.1 Education facilities

The progress and development of a place is closely related to expansion, development and modernization of education facilities. The educational atmosphere in Makum is comparatively good. For school level education, high quality educational institution like Makum Rly Girls HS, Queen English Academy, Hindi Vidyalaya HE, G.B Chowkhani HSS, Jatiya Vidyalaya, Gopal Krishna

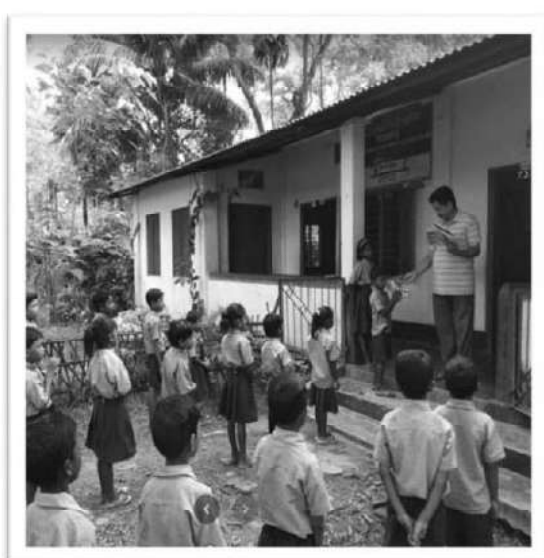


HSetc., for college level education Makum Jr. College etc. provides educational facilities not only to the students of Makum but also the students to its adjoining areas as well as nearby towns. Beside these school, there are so many L.P and High Schools, and many other private play house school providing school education in Makum.

During,1997MakumJunior College established in easternmost part of Assam and it dedicated towards all-round development of the college and other infrastructure facilities to create a suitable atmosphere for the students by providing different amenities which developed as a full- fledged higher secondary school. The Makum Jr. college provide education in two streams Arts & Commerce also provide computer courses, No. of Students 450, Teaching staff – 13 Nos, Office Staff – 9 Nos, Librarian – 1 during the session of 2020-2021



Makum Rly High School



Chota Hapjan Hindi L.P. School

TABLE No-33
List of Educational Institutions in Makum master plan area

LP Schools			
1. Makum Hindi LPS	2. Makum Nimna Buniyadi Vidyalaya	3. Vidya Niketan	4. Makum Adarsha Prhamik Vidyalaya
5. Subhash Nagar LPS	6. Balaya Bhawan School	7. Sankerdev Shishu Niketan	8. Vivekananda Sishu Vikash Kendra
9. Makum Railway LPS	10. Makum Prathamik Vidyalaya	11. Betjan Gaon L.P	12. Betjan Bongali Gaon L.P
13. Chotohapjan Gaon No. LP	14. Chotohapjan Gaon Hindi LP	15. Chotohapjan Gaon no .2 LPS	16. Chotohapjan No. 3 LPS
17. Tengapani T.E 664 / 105 NLR T.E . LP	18. Tingrai Gaon LPS	19. Tingrai Bongali Gaon LPS	
ME Schools			
(a) Makum MES			
High School & Higher Secondary			
(i) Makum Rly HS	(ii) Makum Rly Girls HS	(iii) Queen English Academy	(iv) Hindi Vidyalaya HS
(v) Vidyashri Orient Acadamey	(vi) G.B Chowkhani HSS	(vii) Jatiya Vidyalaya	(viii) Gopal Krishna HS
College			
1) Makum Jr. college			

Source:-<http://schools.org/assam>

URDPFI Guideline for Education facilities

TABLE NO-34

NORMS FOR PRE-PRIMARY NURSERY SCHOOL TO HIGHER EDUCATION

Sl. No	Category	Student Strength	Population served per unit	Area Requirement	Other Controls
1	Pre-Primary Nursery School	-	2500	0.08 Ha	To be located near park
2	Primary School (Class I to V)	500	5000	Area per School = 0.40 Hec. A) School building area = 0.20 Hec. B) Play field area = 0.20 Hec.	Play field area with a minimum of 18 m X 36 m to be ensured on effective play.

3	Senior Secondary School (VI to XII)	1000	7500	Area per School = 1.80 Hec. A) School building area = 0.60 Hec. B) Play field area = 1.00 Hec. C) Parking area = 0.20 Hec.	Play field area with a minimum of 68 m X 126 m to be ensured on effective play.
4	Integrated School without hostel facility (Class I to XII)	1500	90000 To 1 Lakh	Area per School = 3.50 Hec. A) School building area = 0.70 Hec. B) Play field area = 2.50 Hec. C) Parking area = 0.30 Hec.	To be located near a sport facility
5	Integrated School with hostel facility (Class I to XII)	1500	90000 to 1 Lakh	Area per School = 3.90 Hec. A) School building area = 0.70 Hec. B) Play field area = 2.50 Hec. C) Parking area = 0.30 Hec. D) Residential area = 0.40 Hec.	To be located near a sport facility
6	School for Physically Challenged	400	45000	Area per School = 0.70 Hec. A) School building area = 0.20 Hec. B) Play field area = 0.30 Hec. C) Parking area = 0.20 Hec.	To be located near park or sport facilities
7	College	1000 To 1500	1.25 Lakhs	Area per School = 5.00 Hec. A) School building area = 1.80 Hec. B) Play field area = 2.50 Hec. C) Parking area = 0.30 Hec. D) Residential area = 0.30 Hec.	

From the survey it has been found that most of the educational institutions except Makum Rly HS, Gopal Krishna HS, G.B Chowkhani HSS and Makum Jr. College the area of the educational institutions is not sufficient as per **URDPFI** guidelines and there are no adequate play fields and parking facilities.

So, this plan suggests to take measures by the education department as well as private institution to increase the area of primary school up to 0.40 Hectare including playfield area, for Higher & Higher Secondary School up to 1.80 Hectare including playfield and parking area and for the intermediate school up to 3.50 hectare including playfield, parking facility and hostel facility as per URDPFI guideline.

This plan also suggests for the provision for school for physically challenged child / persons in an area of about 0.70 hectare for the enrolment capacity of 400 with adequate playfield and parking facility by the education department or by any NGO associated with social upliftment of the region.

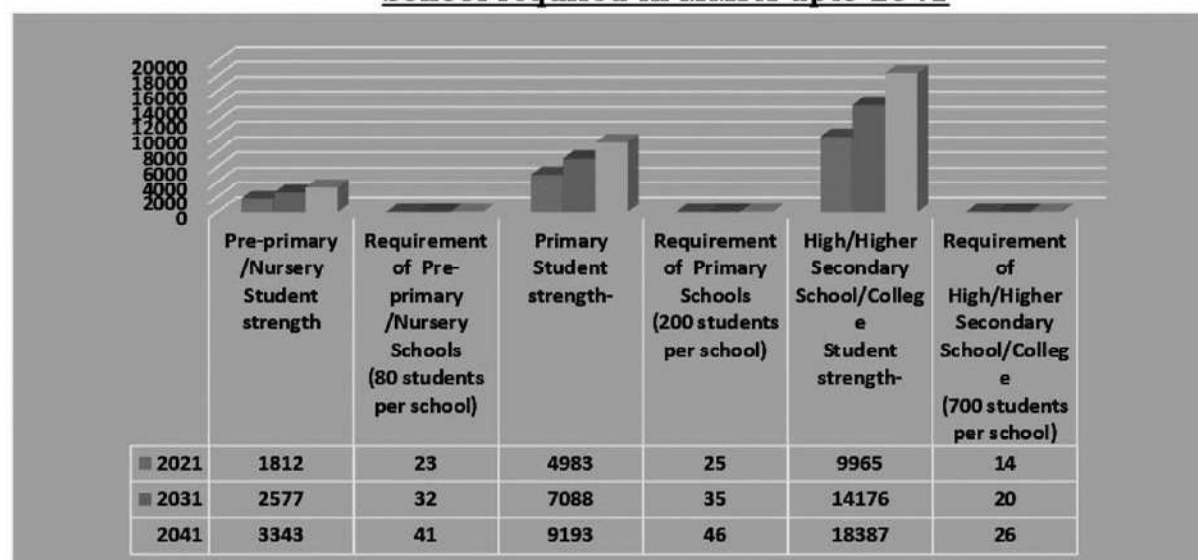
The following table shows the students strength and requirement of schools in Makum Master Plan Area during 2021-2041.

TABLE NO-35
School required in MMPA upto 2041

YEAR	PROJECTED POPULATION	Pre-primary /Nursery Student strength-	Requirement of Pre-primary /Nursery Schools (80 students per school)	Primary Student strength-	Requirement of Primary Schools (200 students per school)	High/Higher Secondary School/College Student strength-	Requirement of High/Higher Secondary School/College (700 students per school)
2021	45296	1812	23	4983	25	9965	14
2031	64437	2577	32	7088	35	14176	20
2041	83577	3343	41	9193	46	18387	26

Source: -Calculated by T&CP, Dibrugarh

FIGURE: -32
School required in MMPA upto 2041



Source: Estimated by Town & Country Planning, Assam, Dibrugarh

The shortage of schools in the plan area, to some extent has been fulfilled by the private institutions at present and it is also hope that in the future, private institutions will play an important role to mitigate the shortage of primary schools as well as High and Higher Secondary schools.

6.2.2 Health Care facilities

Hospitals and healthcare services in the town of Makum and its adjacent areas are satisfactory to some extent due to the existence of Hapjan Block PHC and several other tea garden hospitals. There are 1 PHC, 1 ESIC dispensary, 1 Nursing home in Makum Master Plan area. The people of Makum town also benefited in near future from Tinsukia Medical College, which is under construction. Serious category patients generally rush to Assam Medical College, Dibrugarh situated at a distance of 59 Km from Makum for better treatment.



Hapjan Block PHC



ESI dispensary Makum



Makum Polyclinic

TABLE No-36**List of Health facilities in Makum Master Plan area**

Sl.No.	Name of Health facilities
1	Hapjan Block PHC
2	ESI Dispensary Makum
3	Makum Polyclinic
4	Chota Hajan Tea Estate Hospital
5	Betjan Tea Estate Hospital
6	Longswal Tea Estate Hospital
7	Tengapani Tea Estate Hospital
8	Ganga Bari Tea Estate Hospital
9	Makum SC
10	Tegapani SC
11	Hebeda SC

Source:-Data collected by T&CP, Dibrugarh

URDPFI Guideline for Health Care Facilities

In the health care facilities, the size of a hospital depends upon the hospital bed requirement, which in turns is a function of the size of the population it serves. As per URDPFI guideline the calculation of number of beds is based on:-

A) Annual rate of admission as 1 per 50 population

B) Average length of stay in a hospital as 5 days.

Since the projected population for Makum master plan upto the Year 2041 is 83577, as such, the number of beds required for the said population is: -

- i) No. of beds days per year = $(83577 \times 1/50) \times 5 = 8358$
- ii) No. of beds required with 100% Occupancy = $8358 / 365 = 23$

The classification of healthcare facilities as URDPFI guideline is given in the following table: -

TABLENO: -37
HEALTHCARE FACILITIES

Sl. No.	Category	No. of Beds	Population served per	Area Requirement
1	Dispensary	-	15000	0.08 to 0.12 Ha
2	Nursing home, Child Welfare & Maternity	25 to 30 beds	45000 to 1.00 Lakhs	0.20 to 0.30 Ha
3	Polyclinic	Some observation bed	1.00 Lakhs	0.20 to 0.30 Ha
4	Intermediate Hospital	200 Initially the provision may be for 100 beds including maternity beds	1.00 Lakhs	Total Area = 3.7 Ha. i) Area for hospital = 2.70 Ha. ii) Area for Residential Accommodation = 1.00 Ha.
5	Family Welfare Centre	As per requirement	50,000	Total Area = 500 Sq.m to 800 Sq.m
6	Diagnostic Centre	As per requirement	50,000	Total Area = 500 Sq.m to 800 Sq.m
7	Rehabilitation Centre	-	-	As per requirement

This plan suggests to take appropriate measures by the health department for the provision of 6 nos. of dispensaries at various location within the master plan area covering an area of 0.08 – 0.12 hectare per dispensary serving at least 15,000 person's. This plan also suggests to set-up a family welfare center to serve at least 50000 persons by the health department and also a Re-habilitation center by the Govt. or by any NGO for the upliftment of deprived class of the community.

6.2.3 Parks and Recreation Spaces

The recreational facilities available in Makum is not satisfactory. There is only 1 field i.e., Rajanikanta Field which provides the recreational facilities to the people of the town and 2nd Assam Police Battalion having its own field & another field located at Jyotinagar for recreational facilities. Some tea gardens have their own fields for recreational activities viz. Longswal T.E, Chotahapjan T.E, Gangabari T. E etc. Presently in Makum, there is no Indoor games sports facilities and parks. There are other vacant areas in the master plan area used as recreational purposes.

In Makum Master Plan Area the existing land use for recreational purposes is only 37 hectares i.e. 0.82% of the master plan area or 2.71% of the total developed area. In this plan the proposed Land use for recreation purposes increase to 186

hectares i.e. 4.13 % of the master plan area or 9.25 % of the total developed area keeping in mind the increase of population up to the year 2041.



Rajnikanta Field At Digboi Road



Shamshan field at Jyoti Nagar Path

Sl.No	PARTICULARS	URBAN AREAS (NOS)	RURAL AREA (NOS)	PROPOSAL
1.	Stadium (outdoor)	-	-	-
2.	Stadium (indoor)	-	-	1
3.	Play ground	2	Tea gardens having own playground	
4.	Parks	-	-	2

PROPOSAL FOR IMPROVEMENT OF EXISTING CREMATION & BURIAL GROUND

Sl.No	PARTICULARS	URBAN AREAS (NOS)	RURAL AREA (NOS)	PROPOSAL
1.	Shamshan (Cremation)	2	(Every tea Garden having own cremation ground)	-
2.	Kabristan (Burial)	1	-	-
3.	Christian Cemetery	1	-	-

CHAPTER - 7

7. ENVIRONMENT, TOURISM AND CITY BEAUTIFICATION PLAN

7.1 Description of eco-friendly areas –

There are many eco-friendly sites in Makum which became the pride of Makum.

7.2 Plan/Measures for protection and conservation of environmentally-friendly zones.

Being environmentally friendly simply means having a lifestyle that is better for the environment. It's all about taking small steps towards mother earth so as to make this planet a better place for our communities and generations to come. A good way would be to start with conserving water, driving less, walking more, consuming less energy, buying recycled products, eating locally grown vegetables, joining environmental groups to combat air pollution, producing less waste, planting more trees and many more. The more that we do on our part the faster we will create an environment of living that promotes sustainability.

In the environmentally friendly zone, there is more than just a good recycling programmed in place. People of the town who are committed to conservation and preservation of resources should encourage options like community play grounds, public transportation, green construction and work to change the way that fossil fuels and other resources are used to support community services.

This plan suggests following proposals for protection and conservation of environmentally friendly zones-

- (i) People of Makum urban area should join hand with environmental groups to protect the town and make the environment clean and green.
- (ii) Reduce, reuse, recycle waste hierarchy is the order of priority of actions to be taken to reduce the amount of waste generated and to improve overall waste management processes and programs.
- (iii) Plantation habit should be grown up among the people. For this necessary awareness camp should be organized by competent authority for conservation of natural resources and composting system.
- (iv) Steps should be taken by the authority to stop people from littering on roads. Instead, educate them to put trash and garbage in dustbins. The pile of garbage on road hampers the beauty of the city and also pollutes the air.
- (v) Steps should be taken by the concerned authority to reduce the emitted hazardous chemical and gases in industrial activities.



Plantation habit



Reduce, reuse, recycle waste

7.3 City Beautification Plan/ Proposals-

To improve town's appearance and aesthetic view, neighbourhoods often try to update what is known as streetscape, which pertains to the area between the driving lanes and the edge of the private property. Partly this is a popular strategy because it is public space and it's easy for the government to dictate what will happen there. In truth, streetscape can be quite effective in uniting block faces or a series of blocks that are discordant



in some way, because streetscape often includes plantings, the effect is to soften the view created by streets and hopefully sidewalks. Care in the choice of materials and in the quality of the installation makes all the difference in this form of beautification.

In addition to streetscape, sometimes we need a focal point. This might be public art and open-air theatre, fountains, a clock tower or grouping of tall grasses. If we already have a lonely statue or old historical building with nothing around it, maybe we should add planting beds of considerable size, an inviting bench or two, and maybe an interpretive sign explaining the rest of the story. A tree planting project, either on a vacant plot, in a park, or in the parkway between the side walk and the street is great for improving Town's appearance over the course of a few years at a relatively low cost. Voluntary schemes should be taken up by neighbourhood basis for cleaning up the park of the town. Project should also be taken up for cleaning the river or stream.

7.4 Roadside Plantation-

The main object of road side plantation is to provide protection to road, traffic, check soil erosion, food, fuel, fodder and timber to the society and mitigate climate change issues. Plantation is durable assets that produce fruits and raw-materials for agro based industry, and also generate livelihood after 7 to 10 years.

This plan suggests the social forestry department to prepare project on road side plantation with details of road to be covered, length of road and species of plants to be planned with numbers of plants for entire Makum master plan area.

Plantation of fruit bearing plants, suitable to local agro-climatic condition should be done in every area of the master plan. The authority concern should take steps for organizing camp and awareness program for road side plantation and educate the people about the benefits of road side plantation including its impact on city's landscape.



Roadside plantation

7.5 Urban Agriculture and Urban forestry

Urban Agriculture is the new culture that is catching up in emerging cities. Since the population growth rate is very high, natural resource to feed the increasing population in coming days is going to be a difficult task. So, urban agriculture is seen as a big solution to the problem.



Urban agriculture

Urban forestry is the careful care and management of tree in urban settings for the purpose of improving the urban environment. Urban forestry advocates the role of trees as a critical part of the urban infrastructure. Urban

forest function is thus often oriented toward human outcomes, Such as shade, beauty and privacy. Urban forests bring many environmental and economic benefits to town. Among these are energy benefits in the form of reduced air conditioning, reduced heating by shading buildings, homes and roads, absorbing sunlight, reducing ultraviolet light, cooling the air and reducing wind speed.



Urban forestry

So, urban forestry scheme should be taken by competent authority for afforesting degraded forest land in the Makum master plan area. This type of scheme will act against climate change by creating a carbon sink and against air population in the town. This plan also suggests for starting tree surveys in the town which can be conducted by NGO and college or school students. A plan should be framed to create small nurseries in Govt. school as well as in private institution where there is extra space.

7.6 Public Rain Water Harvesting Scheme

Rainwater harvesting is a process involving collection and storage of rain water that runs off natural or man-made catchment areas, e.g., roof top, Compounds, rock surface or hill slopes or artificial repaired impervious/semi-pervious land surface.

Due to deforestation and the consequent ecological imbalance, the ground water level is going down day by day. The constant rising demand of water supply especially from the urban areas does not match with the surface water sources, as a result of which the water reserves beneath the ground level are over exploited. This consequently results in the water level depletion.



Water harvesting apart from recharging the ground water level, increases the availability of water at a given place at a given point of time. It also reduces the power consumption. It further reduces the run off which chokes the storm water drains, artificial flooding, chances of soil erosion and improves the quality of water. The plan suggests rain water harvesting scheme to be implement by a competent authority. Moreover, the urbanization trend reduces the infiltration rate of rain water into the sub-soil there by reduces ground water recharging.

7.6.1 Development of Parks and Recreation Spaces-

The Plan recommends 186 hectares of land for recreational purposes. The plan envisages an auditorium at Hebeda road to meet the social and cultural needs of the town and also recommends modernizing the existing play ground with adequate infrastructure. The plan also proposes an indoor stadium at Shamshan field, a children park at Chotahapjan tea grant and small size children park at neighbourhood area.

URDPFI Guideline for Parks and Recreation Spaces

The provision of socio- cultural facilities shall correspond to the changing urban demography and work life style.

TABLE NO-38

NORMS FOR SOCIO- CULTURAL FACILITIES

Sl.No.	Category	Population Served per unit	Land Area Requirement (Sq.m)
1	Aganwadi- Housing area / Cluster	5000	200-300
2	Community Room	5000	750
3	Community hall / Marriage Hall/ Library	15000	2000
4	Music, dance and drama centre	1 Lakh	1000

TABLE NO-39
Norms For Recreational Facilities

Sl.No.	Category	Population Served per unit	Area Requirement (Ha)
1	Housing Area Park	5000	0.50
2	Neighbourhood Park	15000	1.00
3	Community Park	1 Lakh	5.00

TABLE NO-40
Norms for Sports Facilities

Sl.No.	Category	Population Served per unit	Area Requirement (Sq.M)
1	Residential unit play Area	5000	5000
2	Neighbourhood Play Area	15000	1.5
3	Town sports centre	1 Lakh	8.00

7.7 Beautification of Major Transit Zone

Makum has emerged as a major transit zone for tea. Tea of Makum transit to all over India. So, it is very much essential to beautify and upgrade the major traffic points like bus stand, railway station, market area of this emerging transit zone of upper Assam.

7.8 Road Signage and Street Furniture

Road signs are signs erected at the side of or above roads to give instruction or provide information to road users. The earliest signs were simple wooden or some milestones. But in course of time, many states of India have been adopting pictorial signs or otherwise simplified and standardized their signs to overcome language barriers and enhance traffic safety, such pictorial signs use symbols in place of words.

Street furniture is a collective term for objects and pieces of equipment installed on streets and roads for various purposes. It included Benches, traffic barriers, bollards post boxes phone boxes, street lamps, traffic lights, traffic signs, bus stops, taxi stand, public lavatories fountains, public sculptures and waste receptacles an important consideration in the design of street furniture is how it affects road safety.

In Makum Master Plan Area existing road signs and furniture are inadequate for increasing traffic and those are not also scientifically designed.

So, the plan suggests to authority concern to take steps for the installation of warning, priority, prohibitory, mandatory, information, facilities, service, direction, position and indication signs in the roads of Makum town, so that local people as well as outsiders can be benefitted and road safety can be maintained.

In Makum master plan area presently there is no street furniture necessary for the public. The concern authority should take steps for the construction of public lavatories at important public places and installation of benches in the park and public places, post boxes, bus stop, taxi stand, waste collectors etc.

This plan recommends for preparation and execution of a city beautification plan covering street light, traffic signal etc. that will enhance the beauty of this resource full town.



Road signage



Street furniture

CHAPTER -8

8. LAND USE PLAN

8.1 Developable and Non – Developable Area of the Master plan

Urban growth and development is often conditioned by the natural landscape like hills, water bodies, forests and manmade impediments like railway line, major roads & canals etc. It is also conditioned by the resources and technology employed in overcoming the impediments and constraints.

Existing Makum master plan is mainly situated in flat land. The soil is very fertile and good vegetation and tea garden is observed in the region.

The quality of urban life and its functional efficiencies are governed by its land-use pattern. In order to understand and analyze systematically the functional relationship between various uses particularly the place of living, business place, industrial activity, education, recreation, agricultural activity etc., a detail land-use survey was conducted during the year 2021-22 to estimate the present and future need of the urban area as well as master plan area. Makum master plan covers an area of 4507 hectare (45.07 Sq.km), out of which developed area is 1365 hectare (13.65 sq.km.) i.e., 30.29 % of the total plan area and non-developed area is 3142 hectare (31.42 sq.km.) i.e., 69.71 % of the total plan area.



8.2 Existing Land Use

The existing land use and the areas occupied by each use in Makum Master Plan Area is shown in the following table:

TABLE NO-41
EXISTING LAND USE –MAKUM MASTER PLAN AREA IN 2022

Use		Makum Plan Area in hectare	Percentage of Makum Master Plan Area (%)	Percentage of the total developed Area (%)
Residential		853	18.93	62.49
Commercial		62	1.38	4.54
Industrial		105	2.33	7.69
Public & Semi Public		71	1.58	5.20
Recreation		37	0.82	2.71
Circulation		130	2.88	9.52
Railways		84	1.86	6.15
Defence		23	0.51	1.68
Total developed area (A)		1365	30.29	100.00
Agriculture		1094	24.27	-
Green Belt	Tea Estate	1702	37.76	-
	Urban Forestry	137	3.04	-
Open Space		129	2.86	-
Water Bodies		80	1.78	-
Total Undeveloped Area (B)		3142	69.71	-
Grand Total Plan Area (A+B)		4507 (45.07 Sq.km.)	100.00	-

Source: - Town & Country Planning, Dibrugarh Land Use Survey 2022.

Figure-33
Existing Land Use Distribution in Makum Master Plan

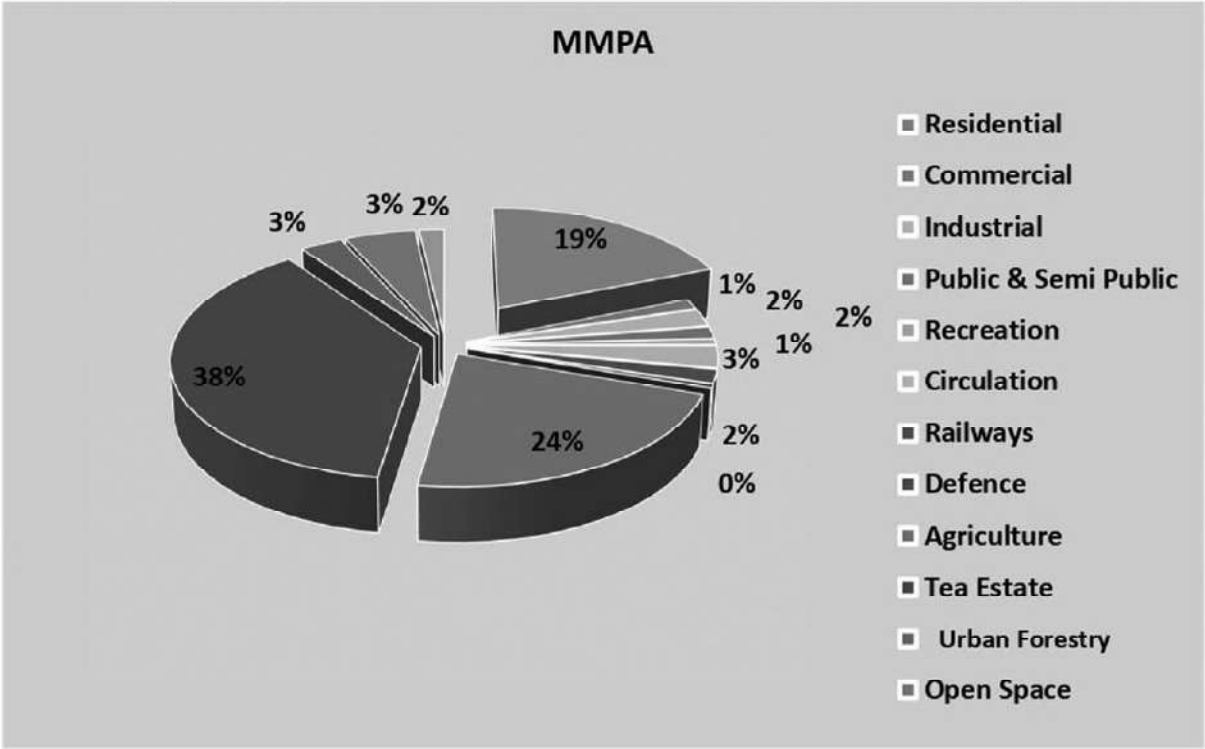
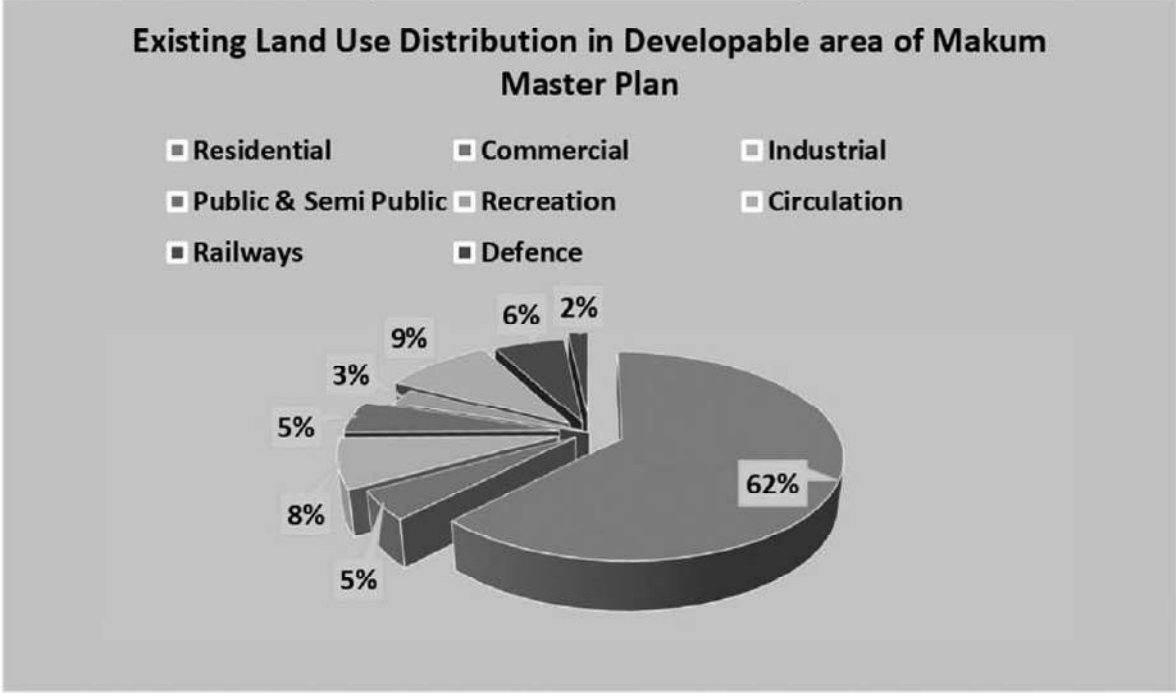


Figure-34
Existing Land Use Distribution in Developable area of Makum Master Plan



In Makum master plan area, 853 hectare of land (18.93% of master plan area and 62.49% of total developed area), is use for residential purposes.

In Makum master plan area, 62hectare of land (1.38% of master plan area and 4.54% of total developed area) is used for commercial and business purposes. The business area in Makum spread over north side of NH-15 from West to East, and in Tengapani road, Digboi road, Betjan Road, etc.in NH-15mainly Vegetable shops, grocery, cloth market, hardware and food market located in compact manner at Makum town. Due to railway crossing at Makum – Digboi road NH- 15 &315 mainly traffic congestion in the area. Even no provision of parking area in market places and on road parking of all types of vehicles including commercial vehicles at NH- 15 & 315

In the master plan area 105 hectare of land (2.33% of master plan area and 7.69% of total developed area) is used as industrial activities.

The land use for Public and Semi-public purposes including educational institutions, government offices, health care etc. are 71hectares of land (1.58% of master plan area and 5.20% of total developed area). The land uses under this had is scattered all over the master plan area.

In master plan area, 37 hectares of land (0.82% of master plan area and 2.71% of total developed area) is used for recreational purposes. In Makum for outdoor games & community programmes 2 playgrounds are Rajnikanta field at Digboi road & Samshan field at Jyoti nagar road

Transportation & circulation network of a town or planning area plays an important role and affects immensely the economic and socio-cultural life of the planning area. A well-developed road network can provide answer to many problems of urban life. Accordingly, in MMPA, the land use for circulation purposes is 130hectares of land (2.88% of master plan area and 9.52% of total developed area).

Railways occupy only 84hectares of land (1.86% of master plan area and 6.15% of total developed area). The railway track is passing through the heart of the town.

In MMPA, land use for agricultural purposes is 1094 hectare of land (24.27% of the master plan area). Agricultural activities mainly take place in Makum Borpathar, Makum Junction gaon, Vishnu Nagar gaon, Amitpurgaon, Krishna nagar,

In the map of India, Makum occupy the place of tea town and this has been proved in the master plan of Makum because tea garden areas occupy

1702 hectare of land (37.76% of master plan area). In the master plan area, there are 11 tea gardens and most of them have their own tea factories.

- Urban Forestry covers an area of 137 hectare of land 3.04% of the master plan area).
- Open space constitutes an area of 129 hectare of land (2.86% of the master plan area). Small size open space area scattered all over the master plan.
- Water bodies constitute an area of 80 hectare of land (1.78% of the master plan).

KEY ISSUES / SHORTCOMINGS

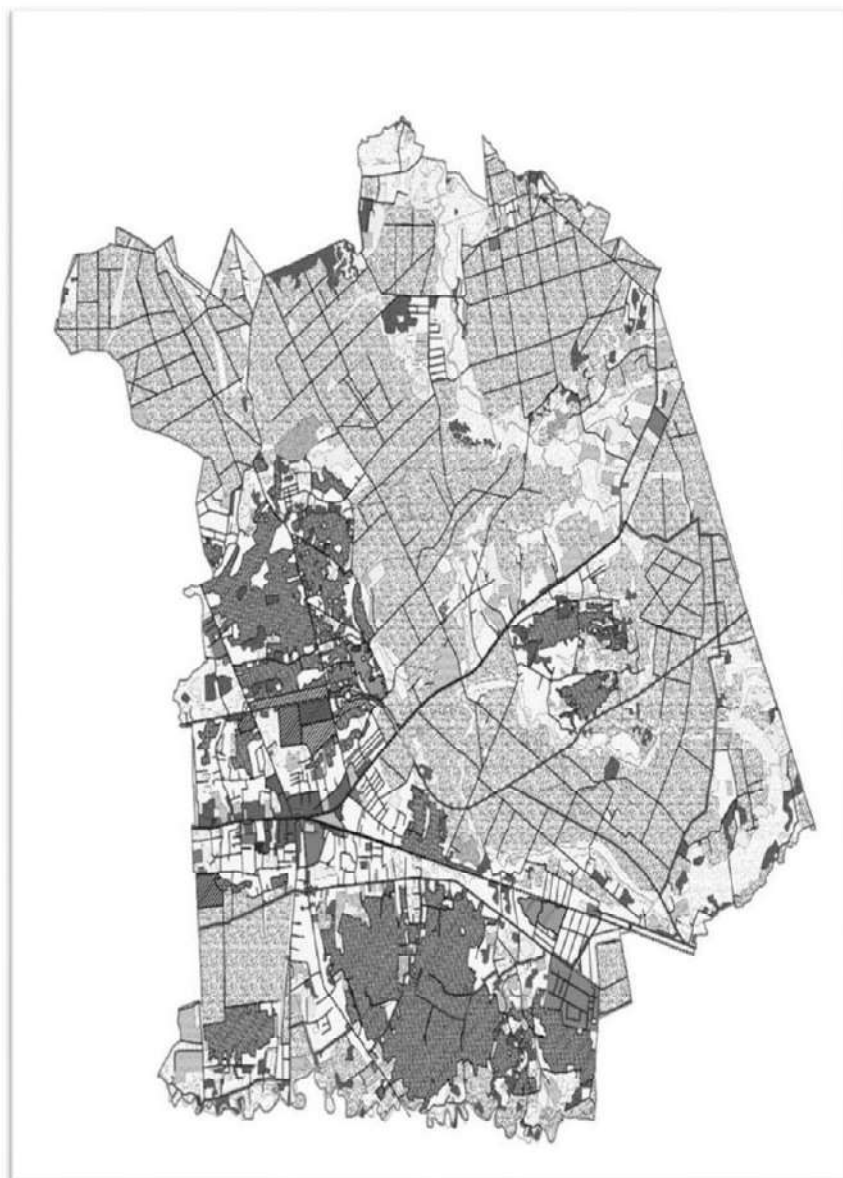
1. Hierarchy of road network is not found, narrow road network with restricted capacity, traffic congestion due to no. of railway crossings and loss of productivity etc.
2. The parking spaces are inadequate.
3. Non-existence of notified industrial area.
4. Inadequate recreational facilities
5. Due to illegal vending sometimes the actual accessible patch of road is decreased to half lane only.
6. Incomplete water supply project.
7. Lack of adequate social infrastructure.
8. Coverage of drainage system is not sufficient in Master Plan area.
9. Lack of proper solid, Hospital and E waste disposal and management system.
10. Encroachment of National Highway land & Encroachment of Railway land

STRENGTH OF MAKUM

- Well connected by Road, Railways and Air
- Traditional economy
- Unique natural beauty of tea garden
- Mini India with diverse culture and social harmony
- Glorious history
- Still manageable

8.3 Proposed Land use:

Land use planning has a bearing on the expansion of the town and put pressure on outer growth area and in rural areas. A change in urban economic function changes its population growth. The decision to set up administrative block, commercial activities, industrial estate, educational institution, health care as well as any government policy to stimulate the urban economy accounts for population growth as well as create opportunities for employment and business expansion.



The proposed Makum Master Plan covers an area of 4507 hectare (45.07 sq.km.), out of which about 2010 hectare (44.60%) of land is proposed to be developed up to the year 2041 for a projected population of 83577 persons.

The following table shows the proposed distribution of land use in Makum Master Plan Area up to 2041.

TABLE NO-42**PROPOSED LAND USE - MAKUM MASTER PLAN AREA UPTO 2041**

Use		Makum Master Plan Area in hectare	Percentage of the Makum Master Plan Area (%)	Percentage of the total developed Area (%)
Residential		1060	23.52	52.74
Commercial		117	2.60	5.82
Industrial		156	3.46	7.76
Public & Semi Public		180	3.99	8.96
Recreation		186	4.13	9.25
Circulation		204	4.53	10.15
Railways		84	1.86	4.18
Defence		23	0.51	1.14
Total developed area (A)		2010	44.60	100.00
Agriculture		574	12.74	-
Green Belt	Tea Estate	1616	35.86	-
	Urban Forestry	137	3.04	-
Open Space		90	1.98	-
Water Bodies		80	1.78	-
Total Undeveloped Area (B)		2497	55.40	-
Grand Total Plan Area (A+B)		4507	100	-
		(45.07 Sq.km.)		

Source: - Town & Country Planning, Dibrugarh Land Use Survey 2020-21.

Figure-35
Proposed Land Use Distribution in Makum Master Plan

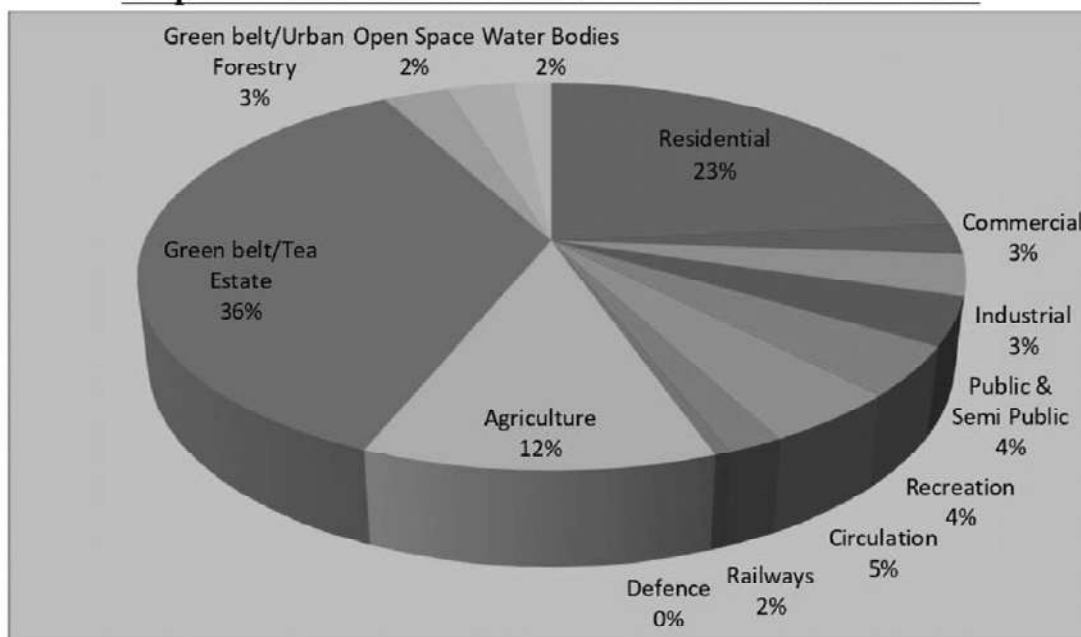
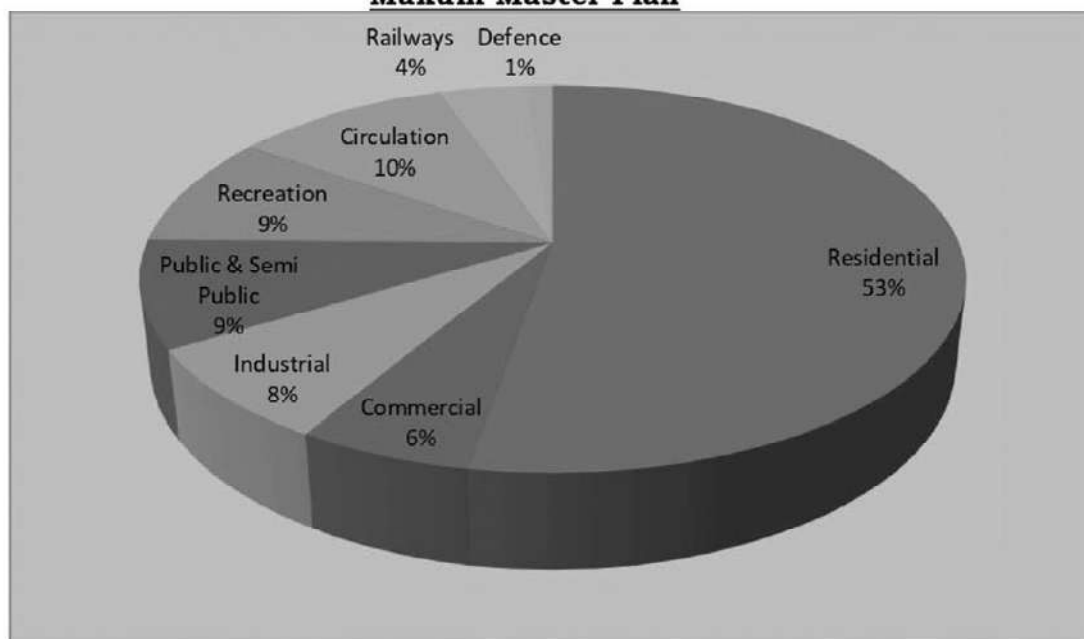


Figure-36
Proposed Land Use Distribution in Developable area of Makum Master Plan



An area of 1060 hectare of land (23.52% of the master plan area and 52.74 of the total developable area) has been earmarked for residential use for projected population of 83577 persons of Makum master plan area up to the year 2041. It is presumed that a part of the total projected population will be

residing in the mixed used areas. In the proposed land use plan, the population density of the master plan area in the year 2041 will be 1776 persons per sq.km. The residential density of MMP area for the year 2041 will be 16 dwelling unit/per hectare. The following gross residential density is recommended in the plan: -

1. Low density : up to 50 persons per hectare
2. Medium density : 50 - 120 persons per hectare
3. High density : 120 - 200 persons per hectare

Land earmarked for commercial activities is 117 hectares of land (2.60% of the master plan area and 5.82% of the total developable area).

Land earmarked for industrial activities is 156 hectares of land (3.46% of the master plan area and 7.76% of the total developable area).

In the plan the land earmarked for Public and Semi-public activities increases to 180 hectares of land (3.99% of the master plan area and 8.96% of the total developable area) for establishing Govt. offices and education institution for the growing population.

In the same way to meet the demand of growing population, the area earmarked for recreation facilities has also been increased to 186 hectares of land (4.13 % of the master plan area and 9.25 % of the total developable area) for establishing parks and indoor game facilities.

In the proposed land use plan, the land earmarked for circulation is 204 hectares of land (4.53% of the master plan area and 10.15 % of the total developable area). In the plan new roads has been proposed to link up the sub-arterial and other road to arterial road. Besides for the efficiency of circulation pattern taxi stand and truck terminus has also been proposed in the plan.

The plan proposes open space of 90 hectare i.e. 1.98 % of the planning area and the plan earmarked open space under the category of no construction zone. An area of 219.02 hect. i.e 1.6 % of the planning area has been earmarked as water bodies in the proposed master plan map. **The plan proposes 15mtr buffer zone or no construction zone along natural water channel, ponds, river and wetland inside municipal area and 50 mtr outside municipal area.**

CHAPTER- 9

9. PROPOSED PROJECT,BRIEF AND TENTATIVE FUNDING SOURCE

9.1 Identify Priority Sectors and Project

The plan proposals for Makum master plan area spread up to 2041. It is quite obvious that the natural development will continue and the private developers will play an important role in this respect. As such, the private development is encouraged in conformity with the master plan. It is strongly recommended to stop unplanned and sporadic developments but to encourage balance planned and sustainable development where the provision for necessary physical infrastructure and socio-economic amenities are economically made possible. There are some immediate necessities as pointed out by the various stake holders, which are to be taken up as priority schemes for the master plan area which is listed below:

Short term Proposals : -

1. Improvement of roads, with street lights and demarcation of notified parking area.



MakumDigboi Road

2. Improvement of existing market situated at Makum Daily Bazar, Weekly Bazar (on Wednesday) near Shamshan Field and Sunday market at Doomdooma road into a well-planned, people friendly business hub.





Sunday Market Makum
Makum Daily Market

3. Construction of Slaughter house.
4. Improvement of existing traffic signal points and setting up new ones.
5. Setting up of Organic farming industry.
6. Construction of Vendor and Hawker market.
7. Construction of public bus stand and truck stand.
8. Improvement of existing hospital and dispensaries.
9. System of regular collection and disposal of garbage in the master plan area by the concerned authority.
10. Preparation of a comprehensive drainage master plan.
11. Proposal for Fire & Emergency Service (Present Police Station, at Chota Hapjan 129)
12. Proposal for Walking Track
13. Protection & preservation of low lying areas, natural channels & ponds.
14. Provision for vending zone in master plan area.

Long term Proposals : -

1. Widening of existing roads as per the IRC guidelines and in accordance with the provisions of "THE ASSAM PUBLIC WORKS (REGULATION OF ROAD DEVELOPMENT AND ROAD TRANSPORT) ACT- 2010" with recommendation that all new road proposal should have UTILITY DUCT.
2. Installation of post at Zero point situated at the junction point of NH-15 & NH-315 police point.
3. Development of TP Scheme for all sections of the society considering the scenic beauty of the town.
4. Rural Economic growth
 - a) Setting up of Organic farming industry.
 - b) Promotion of local handicraft & handicraft
 - c) Linkage with rural tourist spots
 - d) Intervention and promotion of cash crops in rural areas.
 - e) Agriculture credit societies

- f) Provisions of hut / shed for weekly market
5. Setting up of Micro Small and Medium Enterprises (MSME).
 6. Construction of town Hall
 7. Construction of Auditorium & Library.
 8. Construction of Park.
 9. Construction of Municipal hospital.
 10. Construction of Swimming pool
 11. Construction of weekly market at thana road (Makum Junction Gaon)
 12. Development of playground and Construction of Indoor stadium.
 13. Proposal for fuel filling station at Makum Junction Bangali Gaon 1st part & Chota Hapjan 114/ 4 and LPG go down at Betjan Gaon.
 14. Proposal for Cycle Track in the master plan area
 15. Railway Over Bridge (ROB) at NH- 15 / Digboi Road & proposed ring road at Asomiya Balijan Gaon railway track
 16. Effluent Treatment plant at Amguri Gaon and Makum Junction Bangali Gaon 1st Pt.
 17. Faecal Sludge Treatment Plant at Makum Junction Bangali Gaon 1st Pt.
 18. Proposal for improvement of burial and cremation ground.
 19. Proposed ring road passes from Tegapani/ Makum Junction / Tingari Bongali/ Anandabag Bagan/ Railway track
 20. Proposal for fire hydrant in market place and strategic locations of the town.

In the first phase, the schemes like widening and improvement of roads, construction of new roads, provision for required spaces for parks, playgrounds and parking places and improvement of commercial and market areas including existing market, daily bazaar etc. can be taken up. The Makum Municipal Board has to play an important role visioning with other Govt. agencies in formulation and execution of such schemes in the master plan area. All the above schemes need to be carried out to make the plan area in to healthy place of living.

9.2 Fund Requirement for Each Sector/ Project

Fund requirement for each sector project will be finalized by the ULB & concerned line department after preparation of detailed project report as per Govt. instruction.

9.3 Identify Land Site for Proposal

The plan finds the following sites are suitable for taking up the proposals in accordance with the existing trends of growth as well as for balanced development.

- (1) Indoor Stadium at Shamshan Field (Jyotinagar Road).



(2) a) Park : near Makum Doomdooma By Pass at Chotahapjan Tea Grant



b) Park at Makum College road



3) Auditorium & Library at Betjan Chariali at Makum By pass



(4) Railway crossing Flyover: at railway crossing of NH-15 / 315 and road leading to Doomdooma & Digboi.



- (5) Bus & Truck Stand: at Makum Junction Gaon or Borthpathar in Makum By Pass road.



- (6) Cycle track: - Makum By pass



(7) Auditorium: - at Hebeda road



(8) Rotary:

a) At the junction point of Betjan road at Makum By Pass



b) At the junction point of Jyotinagar road at Digboi road.



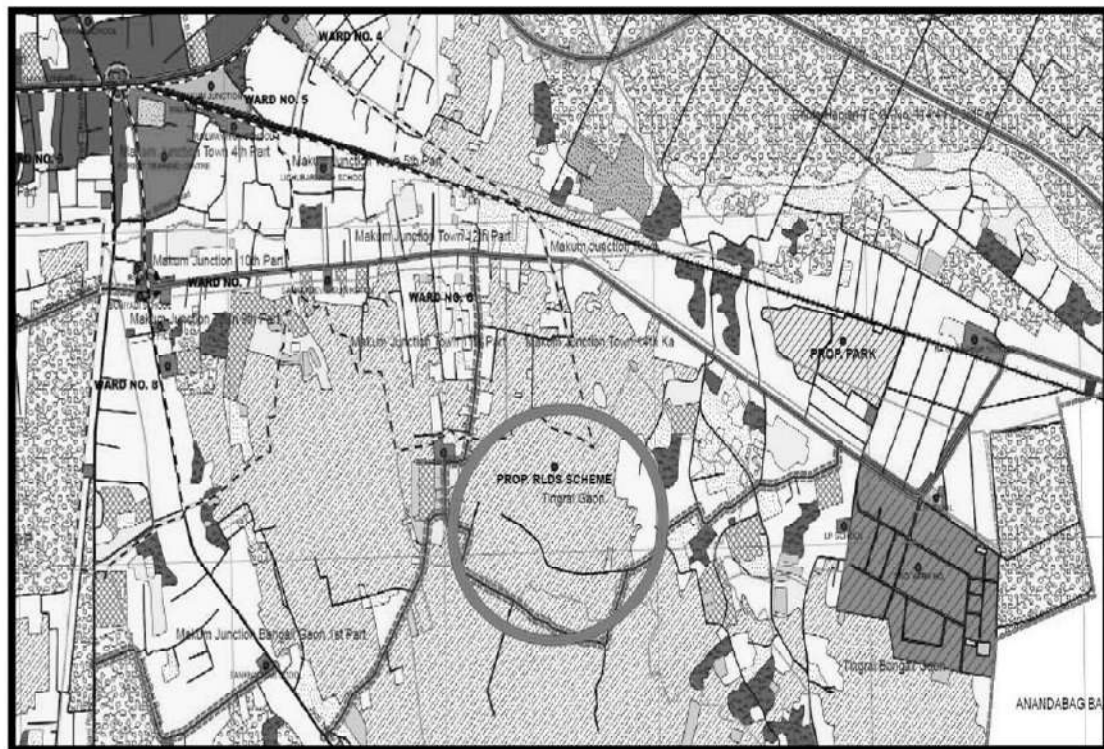
(9) Residential Land Development Scheme (RLDS): - at Makum Junction town sheet no. 14 (Ka)



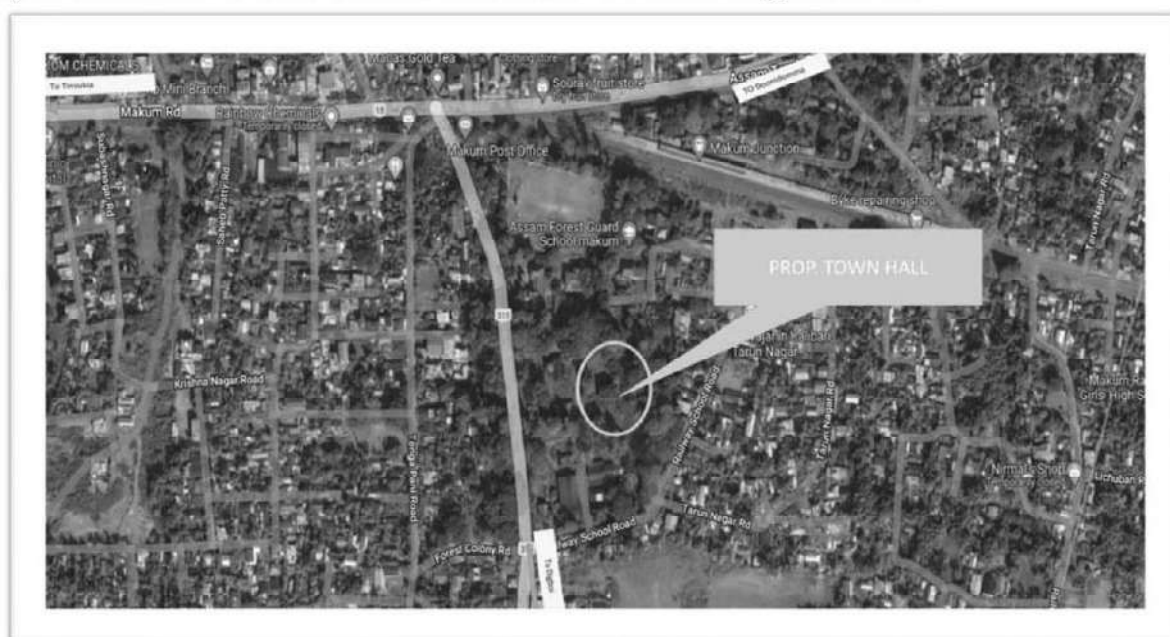
10) Swimming pool at thana road (Makum Junction Gaon)



11) Municipal Hospital along with proposed town planning scheme at Tingrai gaon



12) Town Hall at Forest Timber treatment & Seasoning Division.



13. Ring Road in Southern part of Makum from Hebada Road (near Tinsukia Medical college connecting to NH – 315 Digboi Road

14. Improvement of Burial and cremation ground

15. Vending Zone : (a) Weekly Bazar near Shamshan Field and
(b) Proposed weekly market at Thana road

9.4 Indicative Sources of Fund& tentative project cost

The ULB & concerned line departments will submit the DPR's to their respective departments for sanctioning fund from State & Central Government under various schemes like NLCPR, NEC, 10% pool fund etc. The ULB's can also adopt the policy of Private Public Partnership (PPP) mode for raising the fund for a few remunerative projects.

TABLE :- 43
Tentative project cost of proposals for Makum master plan

Sl.No.	Name of the proposal	Tentative project cost (In lakhs)	Remarks
1	a) Widening and improvement of roads	-	As per the survey.
	b) street lights	100.00	
	c) Development of parking area.	100.00	
2	Improvement of existing market situated at Makum Daily Bazar, Weekly Bazar (on Wednesday) near Shamshan Field and Sunday market at Doomdooma road into a well-planned, people friendly business hub.	2000.00	
3	Development of TPS for all sections of the society considering the scenic beauty of the town.	1500.00	Or proposal may in PPP mode
4	Construction of Slaughter house.	50.00	

5	Improvement of existing traffic signal points and setting up new ones.	200.00	
6	Setting up of Organic farming industry.	300.00	
7	Setting up of Micro Small and Medium Enterprises (MSME).	400.00	
8	Construction of Vendor and Hawker market.	5000.00	
9	Construction of public bus stand and truck stand.	1000.00	Or proposal may in PPP mode
10	Construction of town Hall	1500.00	
11	Construction of Auditorium.	2000.00	
12	Construction of Park & Library.		
13	Construction of Municipal hospital.	1500.00	
14	Construction of Swimming pool.	300.00	
15	Improvement of existing hospital and dispensaries.	800.00	Health Deptt.
16	Development of playground,	300.00	
	Construction of Indoor stadium, parks.	1000.00	
	System of regular collection and disposal of garbage in the master plan	1500	Housing & Urban Dev.
17	Preparation of master plan and execution of a comprehensive drainage scheme.	5000.00	Housing & Urban Dev.
18	Proposal for Fire & Emergency Service.	300.00	Concern Deptt.
19	Cycle Track / Walking track	200.00	
20	ROB at NH-15 / Digboi Road& Ring Road (2 Nos)	15000.00	
21	Effluent Treatment Plant (2 Nos.)	3000.00	
22	Faecal Sludge Treatment Plant	1000.00	
23	Improvement of Burial and cremation ground	300.00	
24	Protection of low lying, ponds & wetland etc.	1000.00	
25	Ring Road		Concern deptt.
	Total Amount (Rs)	45350.00	

CHAPTER- 10

10. DISASTER PLAN

10.1 Hazards Specific Proneness in Makum:

➤ **Earthquake: -**

As per the latest seismic zoning map of India, the Makum region falls under High-Risk Zone- V, where a maximum intensity of IX can be expected.

➤ **Flood: -**

Even urban flooding in many localities due to lack of proper drainage system.

➤ **Soil Erosion: -**

The soil erosion is major threat to many areas due to the Doomdooma river and effecting outside master plan area.

➤ **Fires: -**

The fire takes places in Makum due to short circuit in commercial areas, thatched house. Mainly fire takes place from March to April when the climate remains very dry.

➤ **Cyclone: -**

In Makum cases related to low density cyclone occurred in some places.

10.2 Need for Disaster Management

Data on disaster occurrence, its effect upon people and its cost to countries, are primary inputs to analyze the temporal and geographical trends in disaster impact. Disaster losses, provide the basis for identifying where, and to what extent, the potentially negative outcomes embedded in the concept of risk is realized. They help to understand where, and to whom, disaster risk becomes impact. They also provide the basis for risk assessment processes, a departing point for the application of disaster reduction measures.

Development cannot be sustainable unless disaster mitigation is built into development process. Investments in mitigation are more cost effective than expenditure on relief and rehabilitation. Prevention and mitigation contribute to lasting improvement in safety and are essential to the integrated disaster management system. Disaster response alone is not sufficient as it yields only temporary results at a very high cost. So, emphasis must be on Disaster prevention, mitigation and preparedness, which help in achieving objectivity of vulnerability reduction.

As per Section 40 of Disaster Management Act, 2005 that every department of the State Government shall prepare a Disaster Management Plan.

10.3 Importance of putting Disaster Management Plans In Place

Disasters are events that have a huge impact on humans and/or the environment. Disasters require Government intervention. They are not always unpredictable. Floods take place in valleys and flood plains, droughts in areas with unstable and low rainfall, and oil spills happen in shipping lanes. This predictability provides opportunities to plan for, prevent and to lessen the impact of disasters.

Disasters arise from both natural and human causes, and the responses needed could stretch community and government capacity to the limit. Disasters are inevitable although we do not always know when and where they will happen. But their worst effects can be partially or completely prevented by preparation, early warning, and swift, decisive responses.

Disaster management aims to reduce the occurrence of disasters and to reduce the impact of those that cannot be prevented. The Government White paper and Act on Disaster Management define the roles of Local Authorities as well as Provincial and National government in disaster management.

North East Region has been vulnerable to many natural and manmade disasters in the past. We can notice that most of the disasters have occurred within the last two decades, and the frequency, intensity and magnitude of the disasters are ever increasing.

10.4 Plan Objectives

The objectives of the Disaster Management Plan are:

- Disaster management in the routine affairs of the office
- To provide technical and humanitarian assistance during disaster
- Prompt and effective discharge of office responsibilities during disaster situations
- Ensuring safety of office infrastructure, human resource and other assets
- Ensuring safety of the beneficiaries and others
- Speedy restoration after disaster impact
- To conduct trainings and capacity building for effective prevention, mitigation and response for disasters.
- To undertake information, education and communication activities to create awareness among the communities and the general public.

10.5 Likely geographical extent and magnitude / severity

1) Assam as a whole is within the Zone V of earthquake zone. Especially Makum has witnessed a devastating earthquake in 1950. So, it can be said that geographically and geologically Makum is situated in a very hazards prone zone.

2) Chances of landslide are comparatively less in this region. But fire can broke out in the congested residential, commercial areas and market of the town anytime during lean season. The region has faced cyclones several times in the past. Road accident, rail accident, etc. can occur at any time. Of course riot is not so common in this region.

10.6 Disaster Management Cycle

In multi-hazard response plan, the disaster management cycle has a significant role to play. The four stages of disaster cycle have their own importance in terms of their implementation during, after and before the occurrence of any disaster.

Pre disaster activities

1. Policy development and National, State, district, local level disaster organization formation
2. Vulnerability and capacity assessment.
3. Prevention and mitigation
4. Preparedness, planning and training



Pre disaster activities

1. Policy development and National, State, district, local level disaster organization formation
2. Vulnerability and capacity assessment.
3. Prevention and mitigation
4. Preparedness, planning and training

During Emergency activities

1. Warning (beginning before the actual event)
2. Evacuation, search and rescue
3. Emergency assistance (relief) – food, water, shelter, medical aid

Post disaster activities

1. Repair and restoration of life lines (power, telecommunications, water transportation)
2. Reconstruction and rehabilitation.

10.7 Formation of Makum Disaster Management Cell (MDMC)

So, the Master Plan recommends for formation of a Makum Disaster Management Cell (MDMC) in the office of the Chairman, Makum Municipal Board, as per Section 40 of Disaster Management Act, 2005.

The MDMC has to be constituted with the following functionaries are Chairman/Chairperson of the municipal board as the Chairman of the cell, Vice Chairman of the municipal board as the Co-Chairman of the cell, Chief Executive officer of the municipal board as the Executive Officer and the members are SDO (Civil), Health, Roads, Building, Industries (Refinery), other relevant department and the Assistant/Junior Engineer of the municipal board as Nodal Officer.

The MDMC will give emphasis towards the preparation of Makum Disaster Management Plan. The plan also recommends that the MDMC cell to co-ordinate during emergency with the District Disaster Management Authority (DDMA) located at the Head-Quarter of the District. The MDMC Cell will provide all the available resources and manpower for Disaster Management. This Cell will mobilize the service of technical personnel for the damage survey work to help the District Administration.

The MDMC must meet at least once in six months i.e., in the month of March and September before the Disaster Season (Flood & Cyclone) of Makum town under the chairmanship of the Chairman, Makum Municipal Board & to update the plan. For this one month's prior notice should be given to all concerned departments before convening the meeting. Chairman should review the work of MDMC. An emergency meeting will hold whenever information is received regarding calamity.

10.8 Standard Operation Procedure (SOP)

The Master Plan recommends the MDMC for formulation of Standard Operation Procedure (SOP) for automatic response of the members during disaster.

- Written guideline that precisely defines how operations are to be carried out.
- An organizational directive that establishes a standard course of action.

- Written guidelines that explain what is expected and required of the personnel.
- Standardization of activities: -
 - Identify planned and agreed upon roles & actions.
 - Promotes coordination and communication amongst personnel.
 - Simplify decision making during potentially stressful conditions.

Proper implementation of Assam Notified Urban Area Building Rules – 2014 (ANUABR) & Sensitization among stake holders engaged for construction work / owners to use disaster resistant technologies

10.9 Rainwater harvesting

Makum Zone has experienced heavy rainfall during summer season due to the south-western monsoon that leads to artificial floods not only in the plan area. So, the plan recommends adoption of rainwater harvesting system in construction activities that will reduce the volume of artificial floods in the master plan area and also help to maintain the ground water level.

10.9.1 Do's & Don'ts during

a) EARTHQUAKE



b) FIRE



ANNEXURE-I

Table- 44
Actionable points for various line departments

Sl. No.	Name of line Department/Agency/	Proposal	Action to be under taken towards implementing proposal
1	Makum Municipal Board	Solid Waste Management, Construction of vendor & Hawker Market, Bus & Truck Stand & notified parking, Improvement of existing Market, Construction of Slaughter house, Installation of post at Zero point, Walking track, Improvement of roads in Municipal area, Traffic signal point.	Line department shall prepare concept paper / DPR whichever is applicable as per directive of the government for consideration of funding under 10% pool fund, NLCPR, NEC, State Finance Commission, CSR Fund of Pvt. Sector etc. in a phased manner during the Master Plan period i.e. up to 2041. A few selected schemes like housing colony can be considered under PPP mode.
2	Public Works Department & Makum Municipal Board	Footpath & cycle Track Road signage in roads and in accident prone area Road Signage & Street Furniture, Park	
3	APDCL & Makum Municipal Board	Improvement of street lighting	
4	Public Administration and Makum Municipal Board	Construction of Auditorium & Library, Town Hall	
5	Public Works Department	Widening of Road	
6	Makum Municipal Board and Town & Country Planning Assam	Preparation of Drainage master plan and Development of Drainage system, TP Scheme,	
7	Water resource dept. and Makum municipal board.	1. Protection and preservation of low-lying area, natural channels and ponds. 2. Effluent Treatment Plant and	

		Faecal Sludge Treatment Plant	
8	PHE Department & Assam Urban Water Supply and Sewerage Board	Water Supply Scheme	
9	Education Department, NGO and Private Agency	Education Facilities	
10	Health Department, NGO and Private Agency	Construction of Municipal Hospital, Improvement of existing hospital and dispensaries	
11	Sports & Youth Welfare Department & Sports Association PWD	Development of playground, construction of stadium, Swimming Pool	
12	Makum Municipal Board, Public Administration and NGO	Improvement of Cremation and Burial ground	
13	Social Forestry Department	Roadside Plantation & Urban Afforestation	
14	Agriculture Department	Rural Economic Growth, Urban Agriculture & Organic Farming	
15	PWD & Railway Department	ROB and Ring Road	
16	DICC	MSME	
17	Emergency & Fire service	Fire & Emergency Service and Fire Hydrant.	

